Ethnobiology is concerned with the social and cultural transformation of biological knowledge. Roy Ellen, who has worked among the Nuaulu people of eastern Indonesia for more than twenty years, argues here that ethnobiology is a key theoretical area of anthropological inquiry, because it relies on accessible ethnography to explain the interrelationship between collective representations and cognitive processes. He demonstrates this through a detailed analysis of Nuaulu classification of animal knowledge: the relationship between animal words and animal categories; the construction of different categories and their relationship to one another; and the actual language of classification. The classifications are shown to be context bound and socially embedded, of practical importance to their users, and to reflect an interaction between culture, cognitive processes, and the material world. This is an innovative study which takes our understanding beyond the arid taxonomic abstraction characteristic of earlier work in the field.

Cambridge Studies in Social and Cultural Anthropology
Editors: Ernest Gellner, Jack Goody, Stephen Gudeman, Michael Herzfeld, Jonathan Parry

91
The cultural relations of classification

Head of the clan Matoke and 'Lord of the Land' in the Nuaulu village of Aihisuru; a characteristic pose in the **auwoti** dance: 2 January 1970.

THE CULTURAL RELATIONS OF CLASSIFICATION

An analysis of Nuaulu animal categories from central Seram

ROY ELLEN
The University of Kent at Canterbury

CAMBRIDGE
UNIVERSITY PRESS

CAMBRIDGE UNIVERSITY PRESS
Cambridge, New York, Melbourne, Madrid, Cape Town, Singapore, São Paulo

Cambridge University Press
The Edinburgh Building, Cambridge CB2 2RU, UK

Published in the United States of America by Cambridge University Press, New York

www.cambridge.org
Information on this title: www.cambridge.org/9780521431149

© Cambridge University Press 1993

This publication is in copyright. Subject to statutory exception
and to the provisions of relevant collective licensing agreements,
no reproduction of any part may take place without
the written permission of Cambridge University Press.

First published 1993
Hardback version transferred to digital printing 2006
Digitally printed first paperback version 2006

A catalogue record for this publication is available from the British Library

Library of Congress Cataloguing in Publication data

Ellen, R. F., 1947–
The cultural relations of classification: an analysis of Nuaulu animal
categories from Central Seram / Roy Ellen.
p. cm. – (Cambridge studies in social and cultural anthropology: 91)
Includes bibliographical references and indexes.
ISBN 0–521–43114–X (hardback)
1. Nuaulu (Indonesian people) – Ethnozoology.
2. Folk classification – Indonesia – Seram Island.
I. Title. II. Series.
DS632.N83E43 1993
591′.09598–dc20 92–31673 CIP

ISBN-13 978-0-521-43114-9 hardback
ISBN-10 0-521-43114-X hardback

ISBN-13 978-0-521-02573-7 paperback
ISBN-10 0-521-02573-7 paperback

To the memory of Ralph Bulmer

Contents

	List of illustrations	*page* xi
	List of tables	xiii
	Preface	xv
	List of abbreviations	xviii
	A note on orthography	xx
1	Introduction	1
2	The language of classification	35
3	Processes of identification and the structure of categories	65
4	The relations between non-basic categories	93
5	Consistency, sharing and flexibility	126
6	Social intrusions and cultural styles	149
7	Changes in classifying behaviour	187
8	Cognition and the cultural relations of prehension	215
	Appendices	
	1 Terrestrial mammal fauna	235
	2 Chiroptera (bats)	238
	3 Birds	240
	4 Testudines (turtles)	248
	5 Lizards and related forms	249
	6 Snakes	251
	7 Amphibians	253
	8 Fishes and marine mammals	254
	9 Insects	260
	10 Molluscs	268
	11 Crustacea	271

12 Arachnids 273
13 Annelids, echinoderms, myriapods and related forms 275

Notes 277
References 282
Author index 295
Subject index 298
Index of Nuaula animal names 305
Index of scientific names for animal species mentioned in the text 311

Illustrations

Plates

Frontispiece Head of the clan Matoke and 'Lord of the Land' in the Nuaulu village of Aihisuru

1.1 Mature lowland rain forest and secondary regrowth above Piliana, central Seram — *page* 9

1.2 Typical bamboo secondary regrowth on Matoke land adjacent to the Awau river — 10

1.3 Sago swamp forest at Somau (Tihun) located at the confluence of the Nua and Ruatan rivers — 11

1.4 First-year swidden (**nisi honue**) and dryland cultivation areas on steep land owned by Sorita Matoke above the village of Rohua — 12

1.5 Women collecting freshwater shellfish and prawns along the flooded banks of the river Upa — 13

1.6 Village area at Aihisuru — 13

1.7 Some examples of Nuaulu animal trophies and artifacts made from animal products — 18

Figures

1.1 The Moluccan islands in relation to Sulawesi and Irian Jaya — 4

1.2 The island of Seram and adjacent areas, indicating distribution of Nuaulu clans prior to resettlement — 5

1.3 Location of major contemporary villages and terrestrial biotopes in the Nuaulu extractive area — 7

3.1 Opportunistic reciprocal labelling of two or more categories — 82

3.2	The relationship between primary and terminal degrees of inclusiveness represented as topological space	91
4.1	Relationship between number of individuals in card-sorting test and number of groups elicited	107
5.1	Variation between informants in classifying one portion of the Nuaulu category **poso** (lizards)	133
5.2	Alternative groupings for four Nuaulu reptile categories represented in three different ways	146
6.1	Two ways of representing 'family' resemblances in Nuaulu classification of animals	170
6.2	Tentative classification of Nuaulu spirit entities using taxonomic conventions	177
6.3	Anomaly created by overlap and through contiguity	183
7.1	Genetic and geographical relationship of central and southeast Moluccan languages	198
8.1	Standard abstract representation of a taxonomy	217

Tables

1.1	Total number of specimens collected and examined in the field for various phylogenetic groupings	21
2.1	Genetic classification of Nuaulu language in the Austronesian phylum	36
2.2	Numerical distribution of effective multilingual skills, Rohua 1970	38
2.3	Total number of different animal terms obtained during successive fieldwork phases	42
2.4	Reduplication in Nuaulu animal terms	50
2.5	The lexical structure of Nuaulu animal terms plotted against main morphological groupings	52
2.6	Frequency of different kinds of adjectival qualifier in Nuaulu polynomials	54
2.7	Nuaulu animal polynomials with plant name qualifiers	57
2.8	Some common semantic relations employed in Nuaulu zoological classification	60
3.1	Variations in the correspondence between Nuaulu terminal categories and phylogenetic taxonomic ranks	69
3.2	Nuaulu terminal colour morphs for sea-stars cross-cutting phylogenetic genera	70
3.3	Some examples of Nuaulu category extension	78
3.4	Extended application of Nuaulu categories to include unfamiliar species	80
3.5	The lexical structure of Nuaulu animal terms plotted against rank	88
3.6	Classificatory load of Nuaulu animal terms	89
4.1	The partitioning of classificatory space between basic categories for the Nuaulu animal domain	100

4.2	Results of a card-sorting test conducted in 1975 displayed as a matrix	104
4.3	Summary data on group numbers and sizes for 27 male respondents in card-sorting test	106
4.4	Non-morphological criteria and related coded contrasts evident from Nuaulu animal classification	112
4.5	Comparison of possible Nuaulu life-forms elicited through non-directive and card-sorting methods	117
5.1	Some measures of consistency in the application of terms to amphibian and reptile species by Nuaulu informants	131
5.2	Results of a test in which 25 informants were asked to sort picture cards of reptiles and amphibians into 'natural' groups based on degree of similarity	140
5.3	Marine shellfish gathered by two females of different ages on a single collecting trip	144
6.1	Phylogenetic and Nuaulu inventories for amphibians, reptiles and terrestrial mammals	151
6.2	Some Nuaulu beliefs in species transformation	164
6.3	Distribution of Nuaulu animal totems according to clan	172
6.4	Partial listing of contents of the category **kauke**	181
7.1	Some semantic equivalences between otherwise non-cognate animal terms in Nuaulu and other central Moluccan languages	192
7.2	Terms in selected Moluccan languages for some endemic animal species	196
7.3	Nuaulu animal terms reconstructable from Proto-Austronesian roots	199
7.4	Terms in selected Moluccan languages for introduced animals	202
7.5	Ambonese Malay animal terms with Portuguese origins	207
7.6	Identical or near-identical terms for fish in Nuaulu and Sepa	208
7.7	Ratios of Nuaulu terms for marine and freshwater fish according to comparative linguistic similarity	209
7.8	Life-form terms in selected Moluccan languages	212

Preface

This work comprises eight interconnected essays which address the main arguments, findings and implications of my research on Nuaulu animal classification conducted over a period of 22 years. Included also are 13 appendices which systematically list most Nuaulu animal terms in order of their phylogenetic glosses. The exigencies of academic publishing have prevented a more detailed treatment of each category and their immediate interconnections here, though this can be found in a companion volume, *Nuaulu ethnozoology: a systematic inventory*, produced by the Centre for Social Anthropology and Computing at the University of Kent at Canterbury. Wherever statements require further ethnographic expansion or elucidation in the text which follows, reference should be made to this volume. I have not generally cross-referenced between the two works since the possible ways in which the companion volume might be used as a back-up are potentially so numerous.

Some of the material included in this volume has previously appeared elsewhere, though it is generally used here in a revised and modified form. For permission to reproduce copyrighted text, I would like to thank the editors and publishers of the journals in which the following articles were printed: 'Omniscience and ignorance: variation in Nuaulu knowledge, identification and classification of animals' in *Language and Society*, 1979, 8: 337–64 (Chapter 5); 'Species transformation and the expression of resemblance in Nuaulu ethnobiology' in *Ethnos*, 1985, 50: 5–14 (Part 5 of Chapter 6); and 'Ethnobiology, cognition and the structure of prehension: some general theoretical notes' in the *Journal of Ethnobiology*, 1986, 6i: 83–98 (Chapter 8).

The various periods of fieldwork upon which the study is based have been conducted under the auspices of the Lembaga Ilmu Pengetahuan

Indonesia (the Indonesian Academy of Sciences) in Jakarta, the staff of which have always been most generous and cooperative. The 1975 season was also conducted in cooperation with the Lembaga Biologi Nasional (The National Institute of Biology) and the Museum Zoologicum Bogoriense in Bogor, and I am particularly grateful for the sponsorship of Dr S. Kadarsan in this respect.

Financial support during 1969–71 came from a Social Science Research Council Studentship (No. S68.8243), augmented by grants from the London–Cornell Scheme for research in South and Southeast Asia and the Central Research Fund of the University of London. The 1973 phase was supported mainly by a Hayter Travel Grant. In 1975 I received a Social Science Research Council Award (HR3410.2) for research on 'Nuaulu ethnobiology and ecology', covering the period 1975–77. In both 1969–71 and 1973 audio-visual equipment was provided by the Central Research Fund of the University of London. Acknowledgements are also due to the British Academy, Nuffield Foundation and University of Kent at Canterbury whose assistance on a different project in the same area permitted three further brief visits to south Seram, in January 1981, June 1986 and February–March 1990.

Over the years my ethnozoological work has relied upon the generous help of a large number of specialists. Such support is still unusual in ethnographic research, although very necessary and relatively frequent in ethnobiology. In particular, I have been able to benefit from the expertise of the following staff of the Natural History Museum in London:

Department of Zoology: Mr John Edwards Hill and Mr P. D. Jenkins (Mammalia); Miss A. Grandison and Mr A. F. Stimson (Amphibia, Reptilia); Dr Alwyne Wheeler, Dr P. J. P. Whitehead and Mr O. A. Crimmen (Fish); Mr K. H. Hyatt, Mr F. R. Wanless, Mr Paul D. Hillyard (Arachnida and Myriapoda); F. G. Easton (Annelida); Mr R. W. Ingle and Dr Anthony A. Fincham (Crustacea); Ms K. M. Way, Mr F. Naggs and Mr J. F. Peake (Mollusca); and Dr E. N. Arnold.

Department of Entomology: David R. Ragge, Mrs Judith A. Marshall (Orthoptera), W. R. Dalling (Heteroptera), R. T. Thompson (Coleoptera), Kenneth G. V. Smith (Diptera), D. Morgan (Hymenoptera), Dr W. J. Knight (Hemiptera), Ms Julie Harvey (Library), and Ms Theresa Clay.

Sub-Department of Ornithology (Tring): Dr D. W. Snow, Dr P. J. K. Burton and Mr G. Galbraith.

Other specimens were identified for me by the late Dr Serene in Paris, Mr J. Menzies and the staff of the Department of Biology at the University of Papua New Guinea in Port Moresby, and Dr Soenartono Adisoemato in Bogor. I am also grateful to the British Museum (Natural History) and the Biology Department of the University of Kent at Canterbury for the provision of collecting equipment and preservatives. Dr J. D. Kesby of the University of Kent and the late Dr C. M. N. White of Lytham St Annes were most helpful in providing informed comment on a number of queries. While this monograph is not an account of Nuaulu ethnobotany, the identification of plant species has been a necessary part of a broader understanding of Nuaulu relations with their fauna. I am consequently also indebted to Mr L. L. Forman of the Royal Botanic Gardens at Kew, and Dr Chang Kiaw Lan of the Botanic Gardens in Singapore.

Finally, I would like to thank the following in particular for their support during the various fieldwork phases: Tante Boya, the late Om Myos Sahetapy-Warella and Jan Resmol in Amboina, and the villagers of Rohua, Hahuwalan, Watane, Aihisuru, Bunara, and Sepa on Seram (not least of all Naupati and Saniau Matoke, Saite, Napwai and Komisi Somori, Hotena Nepane, and Unsa Sonawe). Since 1988 I have been able to draw on the work of Rosemary Bolton of the Summer Institute of Linguistics; it is her orthography which I adopt here in almost every instance, while her clarification of various details of nomenclature, semantics and grammar has been invaluable. Jane Pugh kindly modified some existing maps, Brian Durrans of the Museum of Mankind in London has facilitated access to Nuaulu artifacts, while G. A. Nagelkerke, Mrs L. van der Spree-Annyas and Gerrit Knaap have courteously handled a number of queries. Various chapters have benefitted from the critical comments of Paul Taylor, Jim Collins and David Reason, though none would necessarily approve of the final product in its entirety. The work was originally inspired by the various studies of Ralph Bulmer, who has also been a constant source of advice. This book is dedicated to his memory.

Abbreviations

alt	alternatively
AM	Ambonese Malay
arch	archaic
BM	British Museum (Museum of Mankind), London
CM	Central Maluku
cm	centimeters
D	diameter
H	height
incl	including
Ind	Indonesian
indet	indeterminate
kg	kilograms
L	length
lit	literally
m	meters
n	noun
nr	near
PAN	Proto-Austronesian
PCM	Proto-Central Maluku
prep	preposition
prob	probably
RB	Rosemary Bolton; in acknowledgement of the source of a term or meaning
sp (spp)	species (plural)
♀	female
♂	male
?	uncertain determination
0	in a diagram indicates a covert category

Reference to specimens in museums and private collections is indicated using round brackets as in the following example: (e.g. BM As. 1.177 and Ellen 1970.617). Other references are indicated using square brackets, to avoid any confusion.

A note on orthography

As so much of my argument here hinges on the form and meaning of Nuaulu words, orthography is no insignificant matter. My own language materials are extensive, but unsystematic and linguistically unsophisticated. It is therefore a great pleasure, and something of a relief, to be able to draw upon the recent work of Rosemary Bolton [1990], work which at the time of writing is still in progress. The letters which she uses to represent Nuaulu speech sounds are phonemic, and include 11 consonants and five vowels composed of the following phonetic features:

Consonants

Glottal				
Voiceless stops	p	t	k	
Fricatives		s		h
Nasals	m	n		
Flaps		r		
Laterals		l		
Semi-vowels	w	y		

Vowels

		Front unrounded		Back rounded
High	close	i		u
Mid	half open	e		o
	open		a	

The Indonesian alphabet includes all Nuaulu phonemes and is used here without modification. Stress is unmarked in most regular cases and

normally occurs on the penultimate syllable. Indigenous words appear in **boldface**. One consequence of my adopting this revised phonology and orthography, as alert readers may notice, is certain changes in the written appearance of some Nuaulu words (e.g. **totuwe** becomes **totue**). There is not as yet any Nuaulu consensus as to the proper way to write personal names, clans and places. To avoid confusion they usually appear here as in my earlier publications.

Cambridge Books Online © Cambridge University Press, 2009

1

Introduction

1.1 Background to the study

I first undertook fieldwork among the Nuaulu of south central Seram between 1969 and 1971. During this research, with its ecological orientation [Ellen, 1978b], it became increasingly evident that in order to analyse adequately how this eastern Indonesian people interacted with their environment, it was necessary to pay attention to the way in which it was apprehended and classified [Ellen, 1982]. The point, of course, had been made much earlier by Conklin [Conklin, 1957], and had been implicit in much of his subsequent work, as well as in that of others who owe him an intellectual debt. At the same time I was already intrigued and impressed by new ethnobiological reports then appearing, particularly the work of Berlin and his various associates in Mexico, and that of Bulmer and his associates working in Papua New Guinea.

Specifically, my interests were motivated on the one hand by a recognition that ethnobiology was a neglected (though fundamental) part of social anthropology, with implications for the study of subsistence behaviour, ecology, categorisation and belief; and on the other by a fascination with and an admiration for the rigorous techniques employed, and the detailed data obtained, by a handful of dedicated ethnographic enthusiasts. I judged it of some interest to attempt to replicate and evaluate these methods and results in a region – eastern Indonesia – for which they were at that time unknown. More generally, it seemed to me then – as it still does – that ethnobiology constituted a domain of enquiry where the articulation of collective representations with cognitive process, of belief with thought, was at its most accessible. It was methodologically nodal, linking socio-linguistic positivism with interpretative post-

modernism, and could provide an instructive arena in which to explore the unresolved procedural contradictions inherent in these approaches. In other words, the subject could in no sense be regarded as a peripheral frippery but was rather at the heart of that problematic which is properly labelled 'anthropology'. Much water has passed underneath the bridge since then: the literature on the subject has grown exponentially, and some of the problems which engaged me have been attended to by others.

From 1970 onwards I have spent an increasing proportion of my Nuaulu fieldwork assembling ethnobiological data. All told, this has been spread over three main research periods: 18 months between December 1969 and June 1971, three months in 1973 and a further three months in 1975, plus a short two-week visit in January 1981, ten days in June 1986 and three weeks in February–March 1990.[1] The 1975 season was a particularly decisive one since part of my time was spent working with James Menzies, an academic zoologist, who had already cooperated extensively with Ralph Bulmer [e.g. Bulmer and Menzies, 1972–3; Bulmer *et al.*, 1975]. By June 1971 it was already clear to me that I should concentrate on an examination of Nuaulu knowledge, uses and classification of animals. The decision was made for essentially practical reasons: the corpus had to be limited in some way in order to permit as full and detailed a study as possible, and it seemed to me at that stage that I was in a better position to provide complete and accurate identifications and information on animals than on plants. Throughout, the programme of research into Nuaulu ethnozoology has attempted:

(a) to collect systematically and in detail empirical data on indigenous zoological knowledge;
(b) to check the validity, in the Nuaulu case, of some of the generalisations made by other researchers concerning the character of folk classifications of animals; and
(c) to assess the significance of different animal species in ecological and social relations, and to document their utilisation and general cultural significance.

As this work proceeded it became progressively clear that the notion of taxonomic relations, so central a device for those working in the Conklin–Berlin tradition, was an inadequate characterisation of the way in which the Nuaulu ordered and manipulated their animal categories, and that insufficient attention had been paid in earlier work to the implications of the uneven distribution of knowledge within a population, and the flexi-

bility with which particular individuals and groups employed that knowledge. I have tried in my own work to map and measure the dimensions of such variation. My own intellectual socialisation within the British tradition of social anthropology had brought with it an empirical and sociological bias which militated against an approach which seemed to me to reduce 'mundane' classifications to narrow intellectual conundrums to be solved through the application of formal mathematical, logical and linguistic procedures, or which relegated their analysis to comparative and evolutionary speculation about general mental principles of classification or cognition. Some of these doubts have been articulated in the introduction to *Classifications in their social context* [Ellen, 1979a]. Without denying the importance of these matters, my main theoretical concern has been with classifications as situationally adapted and dynamic devices of practical importance to their users, reflecting an interaction – though in a by no means self-evident way – between culture, psychology and discontinuities in the concrete world; a lexical and semantic field firmly embedded in a wider context of beliefs and social practices. This concern with the relationship between order in the mundane world and that of the social world is of particular interest in the context of eastern Indonesia, since the pre-Islamic societies of this arc of islands were among the first to be explicitly analysed as if they were structured systems of social classification based on a series of underlying principles of representation [Fox, 1980; Wouden, van, 1968]. I shall have more to say about this in chapter 6.

Writing in 1990, 18 years since first embarking on this project, it is clear that much of what I have to say of a general nature has now been said (more elegantly and persuasively no doubt) by other independent observers.[2] Inevitably, a manuscript so long in preparation (and repeatedly put aside to attend to more urgent matters) has been overtaken by events. I have tried to acknowledge fully the importance of other contributions in the pages which follow.[3] But more than anything else, this study has taken its shape and impulse from the seminal work of the few anthropologists who first inspired it: Brent Berlin, Ralph Bulmer, Harold Conklin and – perhaps less obviously – Mary Douglas and Rodney Needham.

1.2 Nuaulu culture and society

A full description of Nuaulu social organisation remains to be written, although a short account has been attempted elsewhere [Ellen, 1978b]. The Nuaulu are a people of south central Seram in the modern Indonesian

Figure 1.1 The Moluccan islands in relation to Sulawesi and Irian Jaya, showing (A) Wallace's line of faunal balance, (B) Weber's line and (C) the western boundary of the Australian biogeographic region. Wallacea is the area between lines *A* and *C*. The modern Indonesian province of Maluku includes all islands between lines *B* and *C*, plus the Aru archipelago to the southeast, Sula to the west and Wetar to the southwest. *Note:* Unless otherwise stated, the orientation of all maps is identical to figure 1.1.

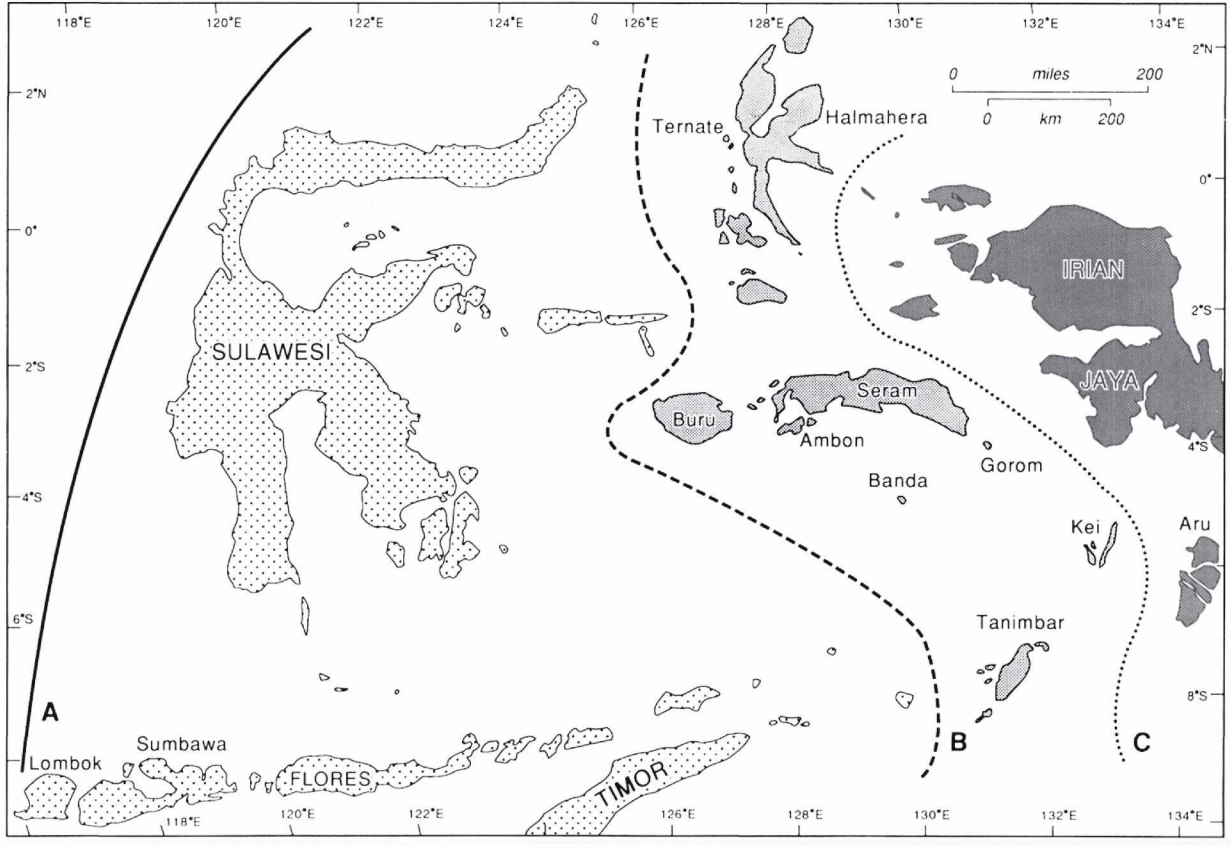
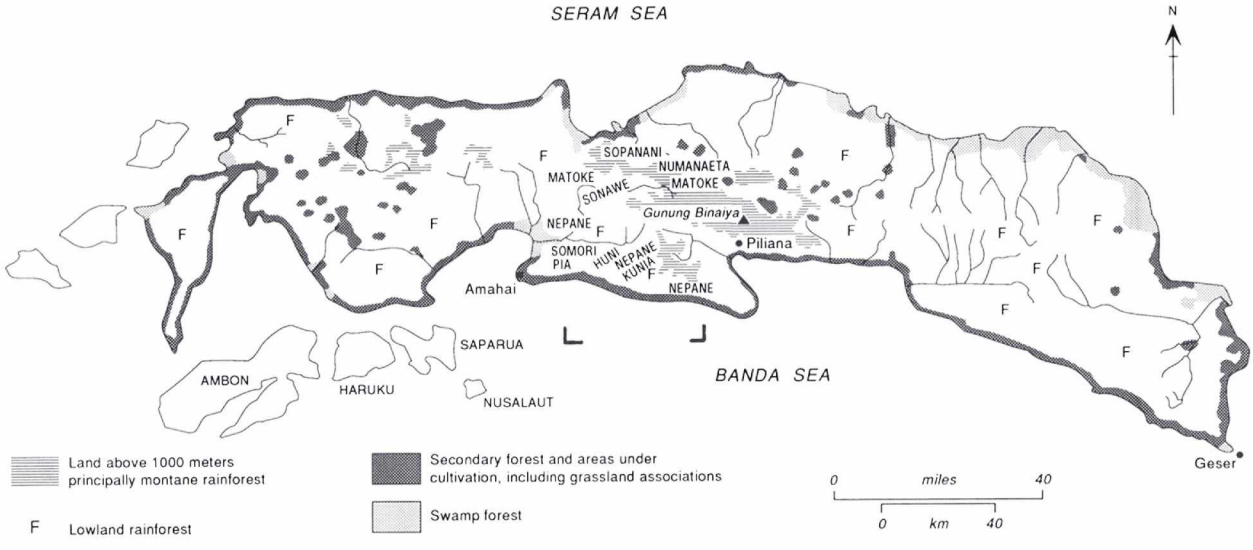


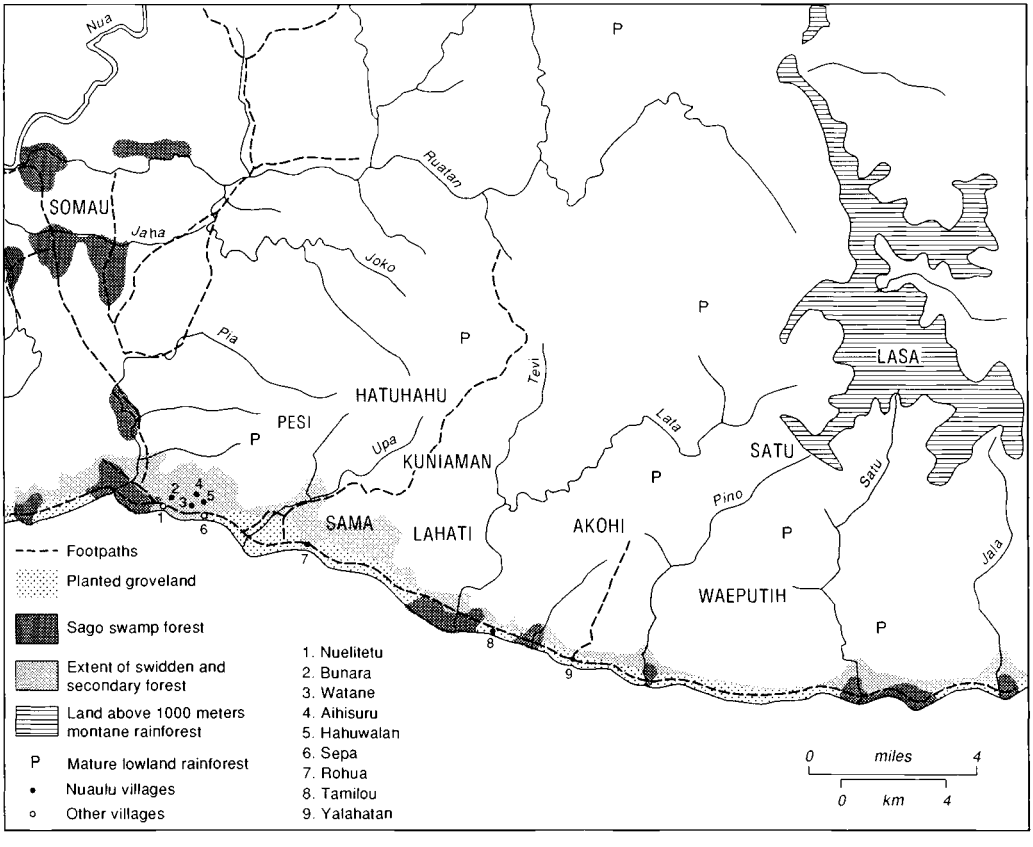
Figure 1.2 The island of Seram and adjacent areas, showing population distribution and principal environmental zones. Elpaputih Bay lies W of Amahai, Teluti Bay SE of Piliana and Seleman Bay half way along the north coast. Adapted from Topographische Dienst 1921, *Eiland Seran en omliggende eilanden* (Scale 1: 5000 000), The Netherlands. The approximate location of Nuaulu clans prior to their movement to the coast, and as elicited from informants, has been superimposed (e.g. MATOKE). Square brackets indicate the bottom corners of the area enlarged in figure 1.3.



province of Maluku (the Moluccas). They inhabited, during the period of my research, five settlements along the narrow coastal strip, in the vicinity of the old Muslim kerajaan of Sepa (figures 1.1–1.3). This is approximately where longitude 129°5' East meets the south coast of the island, in the Amahai kecamatan (administrative sub-district), between the bays of Elpaputih and Teluti. In 1971 they numbered some 500 individuals, and formed approximately half of the speakers of the 'Nuaulu' language group; the remainder living in and around the villages of Oping and Rumaolat on the north coast at Seleman Bay. The population has almost doubled in the two decades since then.

Before the middle of the nineteenth century Nuaulu clans occupied separate hamlets in the highlands around the drainage system of the rivers Ruatan and Nua (figure 1.3). At this time there had been relations between coastal Muslim settlements for at least two hundred years, and the Nuaulu were clearly engaged in intermittent relations of enmity (head-hunting and warfare), alliance, and probably trade.[4] In this respect the situation must have been similar to that of other highland peoples on Seram at that time. Towards the end of the nineteenth century the Nuaulu began to occupy sites near to Sepa, apparently under pressure from the Dutch and the coastal rajas. This movement is significant for the subject-matter of this book since it provides us with a shift in environmental and economic conditions which might be hypothesised to have had radical implications for their knowledge, classification and use of local fauna. At the present time, Nuaulu ecological and economic relations remain, significantly, oriented to the mountainous interior of the island, rather than to the coast. The most important starch staple is *Metroxylon* sago. This is largely extracted from forest palms, though it is sometimes planted. The forest is also the source of most animal protein, much vegetable food, and materials for manufacturing and other technical purposes. Swiddens are cut each year within a four-kilometer radius of the village, are energy intensive, but contribute a disproportionately small amount of the total diet [Ellen, 1988a]. Garden crops are varied, but with manioc, taro, sweet potatoes, yams, bananas and plantains predominating. Prior to the 1939–45 war most cash was obtained by the Nuaulu through the collection and trade of forest products, such as dammar resin (*Agathis dammara*), but since Indonesian independence Nuaulu have become increasingly involved in the growing of clove and coconut palms for copra. Animal domestication for food is virtually nonexistent except for fowl, though dogs are kept for hunting.

Figure 1.3 Location of villages and approximate distribution of major terrestrial biotopes in the Nuaulu extractive area, as of 1971. Names in upper-case lettering indicate specific areas of forest distinguished and used by the Rohua Nuaulu. Nuaulu villages are indicated by solid circles (●), other villages by empty circles (○). It should be noted that commercial lumbering activities and government resettlement schemes from 1975 onwards have now considerably modified the pattern of land use. Adopted from Topographische Inrichting 1919, *Schetskaart van Ceram* (Scale 1: 100 000), Batavia; modified on the basis of field cartographic data and notes.



Prior to resettlement, the Nuaulu clan (**ipan**; alt. **ipa**, **ipane**) was an autonomous patrilineal and exogamous descent group occupying a single hamlet. The **ipan** still retains considerable independence in ritual, political and economic matters, but except for the village of Hahuwalan all contemporary villages consist of five or more clans. The Nuaulu first became incorporated within the administrative structure of Sepa, as a separate 'soa', for a period under their own raja, and around 1882 became

part of the 'Onderafdeeling' of Amahai. By the time of Indonesian independence there were three Nuaulu administrative units, though five physically distinct hamlets. Each of the administrative villages of Bunara, Niamonae (in Malay, 'Nuaulu Lama', containing the separate hamlets of Watane, Hahuwalan and Aihisuru) and Rohua,[5] were accorded a permanent government head ('kepala pemerintah') in a state-imposed scheme.

Each **ipan** is divided into two **numa**, descent groups focussed on a ritual house and headed by either an **ia onate ipan** or **kapitane**. The **numa** of each clan are in ritual opposition to each other [Ellen, 1986: 7–8]. Marriage is ideally between bilateral cross-cousins, and therefore functionally consistent with relationships between pairs of clans which may endure over many generations. However, any one clan is likely to have relations of marital alliance with many others, while marriage with actual classificatory cross-cousins is rare. Clans are theoretically equal in their status, an arrangement which matches an ideology of prescriptive bilateral cousin marriage, traditional clan autonomy and the absence of an overarching indigenous political authority. The clan Matoke, nevertheless, is a ritual *primus inter pares*, providing as its headman what in Ambonese Malay is known as the 'tuan tanah', or Lord of the land.

1.3 The environmental context

The island of Seram lies in the central Moluccas (figure 1.1) and is therefore part of the biogeographic region of Wallacea, a term used in this monograph to designate conveniently those islands lying between the Sunda and Sahul continental shelves [Darlington, 1957: 462–73; Ellen, 1978a; White, 1973: 175]. In biogeographic terms, it marks a zone of transition between the oriental biota of southeast Asia and that of Melanesia, Australia and beyond. Its western boundary is marked by Wallace's faunal line, its eastern boundary by Lydekker's line. Because it is a transitional zone of small islands the fauna is, for many land-based groups, a relatively depauperate one.

The larger islands of the Moluccas (Seram, Halmahera, Buru) are still dominated by tropical rainforest, although most of the small islands are now denuded and extensively planted with clove, nutmeg, coconut palms and other useful trees, and subjected to forms of dryfield cultivation, especially along level coastal land.

Seram itself (figure 1.2) can be usefully divided into about ten terrestrial biotopes [see also Ellen, 1984: 177–9]:

1. montane forest
2. mature lowland rainforest (plate 1.1)
3. mixed secondary forest
4. bamboo brush (plate 1.2)
5. sago swamp forest (plate 1.3)
6. swidden and dryfield cultivated areas (plate 1.4)
7. planted groveland
8. freshwater rivers, streams and pools (plate 1.5)
9. grassland
10. settlement sites (plate 1.6)

To this we can add a further four coastal and two marine biotopes:

11. the littoral
12. rocky shores
13. sandy shores
14. muddy shores, mangrove swamps and estuaries
15. coral reefs, banks and atolls
16. deep sea waters

Plate 1.1 Mature lowland rain forest and secondary regrowth above Piliana, central Seram: 20 July 1975. The altitude is approximately 1000 meters.

Plate 1.2 Typical bamboo secondary regrowth on Matoke land adjacent to the Awau river: 9 August 1973.

During the periods of fieldwork on which this monograph is based, research has been centred on the village of Rohua, which in 1971 had a population of 180. The area from which the Rohua Nuaulu extracted during these times – some 900 km^2 – broadly coincides with the drainage basins of three major water course systems: the Ruatan, Pia and Lata–Tevi (figure 1.3). It is to this that I refer when I speak of 'the Nuaulu area': the greater part of the land mass between Elpaputih Bay in the west and Teluti Bay in the east, south of the watershed formed by the central mountainous spine of the island. All of the terrestrial biotopes listed above are found in this area and their composition is familiar to the Nuaulu. It includes the heavily populated and cultivated coastal strip, secondary forest surrounding areas of settlement, mature lowland rainforest and swamp forest. Typical lowland rainforest stretches from sea level mountainwards, and dominates the overall ecology of the area. Montane and sub-montane rainforest is found above 1000 m, but the only occasions on which this zone is traversed by Nuaulu is during journeys to north Seram, on the longer hunting expeditions to the headwaters of the Nua, Ruatan, Kawa or Lata, or in collecting resin from the conifer

Plate 1.3 Sago swamp forest at Somau (Tihun) located at the confluence of the Nua and Ruatan rivers: 13 August 1975. Note bivouac and apparatus for processing sago, and absence of all vegetation other than *Metroxylon* palm. Beneath the debris of sago petioles is about one meter of standing water and silt.

Plate 1.4 First-year swidden (**nisi honue**) and dryland cultivation areas on steep land owned by Sorita Matoke above the village of Rohua: 8 August 1973. Note garden hut (**numa nisi**) in mid ground; visible in the foreground is taro and banana, with a young clove seedling in the bottom right.

Plate 1.5 Women collecting freshwater shellfish and prawns along the flooded banks of the river Upa: 4 August 1975.

Plate 1.6 Village area at Aihisuru: 16 August 1973. The surface is very rocky and what soil there is, is highly eroded.

Agathis, a particularly prominent feature of higher areas on the southern slopes of central Seram.

In composition and structure, lowland evergreen forest (mostly on low hill land) is typical of adjacent afforested areas of Southeast Asia and New Guinea, though species diversity is low, 10–30 species per hectare not being uncommon. In the south central part of the island, the dominants of the more inland and highland areas, representatives of the families Fagaceae, Lauraceae, Icanaceae, Ericaceae (rhododendrons), together with *Agathis*, are replaced towards the coast by *Shorea, Canarium sylvestre, C. indicum*, species of *Terminalia, Calophyllum, Myristica*, and hardwoods such as *Pterocarpus* and *Diospyros*. Up to 50 per cent of the volume over 35 cm diameter are Dipterocarps. There is one species of Eucalyptus, *Eucalypt deglucta*. In favourable localities the giant *Melaleuca cajuputi (= leucodendra)*, and *Melastoma* (*Malabathricum*?) are common, as are stands of *Ficus* and *Casuarina* in riverine areas. These same lowland areas contain both permanent and seasonal swamp forest, providing a valuable source of naturally propagating *Metroxylon*.[6]

The population density of Seram is low – about 0.07 persons per hectare. As a result there has been relatively little succession to anthropogenic grasslands, particularly in the Nuaulu area. Level coastal land is heavily cultivated with a considerable proportion devoted to cash-cropping of cloves and coconuts. The land rapidly steepens away from the shoreline and even coastal populations such as the Nuaulu are forced to cultivate gardens on the steep valley walls of the short rivers descending to the sea. In some localities there are more extensive areas of low-lying land, such as around the mouth of the Ruatan river on Elpaputih Bay. Some of this has been used for garden land and in places has succeeded to grassland. Other areas are too swampy. Of the marine biotopes, the Nuaulu have an intimate knowledge of only the littoral and rocky and sandy shores characteristic of the coastline immediately adjacent to their villages, and no firsthand knowledge whatever of deep sea.

Appendices 1–13 of the present work list all animals reported for Seram in the Nuaulu area, and these are further discussed systematically and in detail in *Nuaulu ethnozoology: a systematic inventory* [Ellen, 1993]. Here it is only necessary to note two general features about these data. The first is that, for geographic reasons, the land vertebrates of Seram and the Moluccas in general are surprisingly little differentiated, with the possible exception of birds and murids. This is certainly so when compared with New Guinea. The frogs include no endemic genera and few

endemic species. Reptiles, murids, bats and also birds seem to include more distinct endemics. This comparison is in part subjective, being based on our rather limited current knowledge of this area, but there can be little doubt about the low level of endemism for the non-murid terrestrial mammals of the lesser Sundas [Ellen, 1978a: 144–7]. Such a low species diversity index has obvious implications for understanding Nuaulu classification of animals, and I shall return to it in a discussion of the relationship of Nuaulu categories to biological species. The second feature is that in comparing lists for definitely recorded genera and species on Seram as a whole with the equivalent lists for the Nuaulu area in particular [*ibid.*: table 1 and 2], the number of lizards, snakes, marsupials, bats, even-toed ungulates and rodents recorded for the Nuaulu area is less than the number for Seram as a whole, in some cases strikingly so. It may be that certain species are actually unrepresented in the Nuaulu area, or that provenances given in the older literature and museum collections are doubtful, while older and poorly known species often turn out to be only subspecies or varieties. For these and other reasons – including the very arbitrariness of the species concept – competent zoologists are justifiably circumspect in the reliance they attach to 'number clues' to evolution and dispersion obtained through quantifying taxa [Darlington, 1957: 31–2]. However, these things are unlikely to explain satisfactorily wide discrepancies, as in the case of bats. In this and other cases it is probably simply that collections have been insufficiently exhaustive. Animals in niches only rarely visited by the Nuaulu are less likely to come to light during the course of fieldwork, and some species present in the area may well be unknown to informants. There is, for example, the Seram island bandicoot (*Rhynochomeles prattorum*) which occurs in the upper limits of the Nuaulu extractive environment, above an altitude of 1000 m. Although it is allegedly known to, and hunted by, the mountain villagers of the Manusela area, from where it was first recorded, I have no conclusive evidence that it is known to the Nuaulu, despite repeated enquiries during six stretches of fieldwork.

All word lists collected on Seram have, from the earliest times, contained some terms for animals. Likewise, most accounts of fauna have also contained information on local names, uses and beliefs. G. E. Rumphius, for example, must be counted as an important source for Ambonese ethnobiology. Not only does he provide us with early Ambonese Malay and other local terms, but he also gives details on animals as pests and as sources of economic products, on veterinary science, on their medical uses, and local beliefs concerning them [Rumphius,

1741 [1705]; Rumphius, 1741–55]. But the ethnobiological interest in Rumphius' work lies not only in what he reports concerning the Ambonese, but in the way in which Ambonese and Malay conceptions of knowledge influenced his own ideas, and through them the subsequent development of scientific nomenclature and taxonomy [Peeters, 1970].

For the most part, word-lists collected by naturalists rather than linguists have been the more extensive, more accurately glossed and more ethnobiologically informative. Wallace, 1962 (1869) includes many useful folk-biological observations and word lists. Ribbe, who is mostly noted for his 1884 entomological work on Seram [Ribbe, 1889], recognised the crucial adaptive significance of native knowledge of indigenous fauna [Ribbe, 1892: 175–6], as well as continuing the tradition of intermeshing ethnographic observations with a more general description of his visit. The combination of zoological and linguistic competence is rare enough, but when it occurs the results are generally immensely fruitful. From a folk-zoological point of view, the ornithological work of Edwin Stresemann is important [Stresemann, 1914], almost certainly because of his complementary linguistic interests [Stresemann, 1927]. For the first time we are provided with a large number of local Seramese terms for different kinds of birds, accompanied by specific provenances and careful taxonomic identifications. Among Stresemann's terms are 19 for the Nuaulu.

1.4 Obtaining zoological data

It is no longer excusable for ethnographers to collect local animal terminologies without having taken all reasonable steps to establish their accurate scientific glosses. Without such information, the value of detailed data on their habits, uses, ritual aspects and general folklore is diminished, and may sometimes be quite useless for subsequent workers. Even if we conclude that phylogenetic categories[7] are no more 'real', and are as much a part of a folk tradition as those of the Tzeltal, Kalam or Nuaulu, they still provide a baseline for ethno-linguistic description and analysis, an indispensible 'etic grid' [Hunn, 1975c: 309] for cross-cultural comparison. The importance of this exercise is not simply to highlight curious contrasts with the 'scientific' view of the universe, or to amaze ourselves with the similarities between folk and phylogenetic models, but because biological taxonomy provides a highly convenient and (ideally) a universally consistent reference plane which can be applied cross-culturally and through which one folk practice can be compared with another. It allows the analyst to avoid the hopeless relativism associated with the view that because our minds are socially constructed, objective

knowledge can be no more than a chimera [Ellen, 1978a: 142]. Furthermore, there is no economical way of glossing folk categories *except* by using scientific zoological identifications [Bulmer, 1969: 4].

Provision of actual specimens adds vital stimulus material when discussing ethnozoological matters. One can no more think of studying animal classification without animals than one might study colour classification with descriptions of colour rather than examples. Thus, questions in the abstract will seldom elicit more than a basic set of widely-shared terms, and will be particularly poor in terminal categories. The presentation of actual specimens invites detailed examination and identification. Moreover, if – as happened to me on many occasions – you repeatedly obtain just one common species of a genus more widely represented, you may equally be given 'generic' terms by an informant. Only when a different species is presented are names for terminal categories revealed for both types. This was the case with Nuaulu **makasisi popole**, a term used for various genera of robust dragonflies and related forms. Similarly, it is common to obtain initially a list of names for terminal categories which are clearly closely related, but whose relationship only becomes disentangled when actual specimens begin to turn up; while synonyms may be treated as referring to separate categories unless linked to actual specimens. The careful collection, identification and full documentation of animal specimens has, throughout, been the most important and time-consuming aspect of my ethnozoological work.

Specimens were mostly obtained in the vicinity of Rohua, at sea level. They seldom came from outside the area demarcated by the borders of the most distant gardens, that is from the *inner* area of the Nuaulu extractive environment. However, during late July 1975 small collections were made near the Jala river estuary at sea level and at nearby Tohai, in the non-Nuaulu village of Piliana at an altitude of 700 m in the central highlands north of Teluti Bay, and at Somau (Tihun), an area of swamp forest towards the mouth of the Ruatan river frequented by the Nuaulu for the purpose of collecting wild sago. Jala, Tohai and Piliana are well outside the Nuaulu extractive environment (figure 1.2), and specimens collected by Menzies, with the help of local assistants, were only later discussed with Nuaulu informants in Rohua.

Most of the procedures adopted for the collection of specimens have followed the recommendations laid down by Bulmer [Bulmer and Tyler, 1968: 335–7; Bulmer, 1969], and I have tried to emulate and adapt the rigorous data-production techniques used by Berlin *et al.*, 1974 in their study of Tenjapa Tzeltal ethnobotany. I have also added to the repertoire

a
b
c
d
e
f
g
h
i
j
k

Plate 1.7 Some examples of Nuaulu animal trophies and artifacts made from animal products. Figures in parenthesis refer to Museum of Mankind (London) specimen numbers. The items are not reproduced to the same scale, though maximum length in each case is given in the legend.
(a) Cassowary (*Casuarius casuarius*) hind feathers used to decorate male armbands: **sinsin asuwani hunue**. L. 42 cm. (As 1.191–192). (b) Pair of immature antlers and top of cranium from Moluccan deer (*Cervus timorensis moluccensis*) used as househooks: **tanapaku**. L. 18 cm. (As 1.8). (c) Bradawl made from cassowary legbone (**kahate**), and used mainly in the manufacture of sagopalm leafstalk containers. L. 14.5 cm, 13.5 cm. (As 1.143, As 1.148). (d) Hornbill (**sopite:** *Rhyticeros plicatus ruficollis*) feather trophy and charm. L. 21 cm. (Ellen sp. no. 18–8–73). (e) Head-dress (**orane**) feathers of white cockatoo (**nakutua putie:** *Cacatua moluccensis*), cassowary plumes (**asuwan:** *Casuarius casuarius*), nautilus shell (**nakatua saha:** *Nautilus pompilius*) and scraps of red cloth. H. 55 cm. (As 1.172). (f) Tobacco pipe (**supako**) made from the wing-bone of a large bat, probably *Pteropus melanopogon melanopogon*. L. 9.5 cm. (As 1.219). (g) Beak of hornbill (**sopite:** *Rhyticeros plicatus*) kept as trophy. L. 22 cm. (As 1.254). (h) Pig's tail (**hahu etute**) attached to vegetable fibre loop (*Sus scrofa*). Charm worn around neck, especially by young children, to ward off sickness. L. 24 cm. (As 1.243). (i) Broken and blackened pig's jaw (**penesite**). Trophy hung in roofspace of house. L. 24.5. (As 1.256). (j) Armband (**nonie**) made from cassowary quills, rattan and bark; worn by adult men on all major ritual occasions. D. 10.5 cm. (As 1.188). (k) Shell (**nunu kakante:** *Tridachnes elongata*) used as domestic scraper and spoon. L. 7.1 cm. (As 1.44).

---

of techniques discussed by Bulmer, but have only modified them when special interests and local conditions have made it imperative that I should do so.

Whenever conditions permitted, and when equipment was available, animal specimens were collected. Most were obtained for me by informants in the course of their normal daily activities. In some cases I was present when an animal was caught, and in such situations was able to make detailed notes on habitat and behaviour. When this was not possible, informants had to be relied upon for information regarding the context of capture, and in some cases of killing. Nuaulu collectors were asked to provide information on the location, behaviour and habitat of animals. I have no reason to believe that this was a particularly unreliable procedure, and in many cases I was able to visit the site of capture afterwards to check up on the circumstances of encounter and other contextual information. The conditions of fieldwork, and perhaps also my own preferences, have resulted in more complete documentation for (as far as vertebrates are concerned) reptiles, amphibians and mammals, than for birds and fish. Consequently, the accompanying ethnozoological data

are better for the first three groups than for the rest, something which is inevitably reflected in the weight of illustrations employed.

Most animals were live when brought to me by informants, but a proportion were damaged, and some were already dead (either on discovery or by the time they reached me). In 1975 small mammals (primarily murid rats) were obtained by setting baited live and break-back traps overnight, while lamps and mist nets of fine nylon stretched across entrances to caves were used to collect bats and swiftlets. As it happens, the traps did not prove very effective. Other animals, such as frogs, were caught live by hand or with hand-held nets, by both Ellen and Menzies, and were subsequently discussed with informants.

Although some small specimens were killed in the field by body compression, most larger specimens were killed by injecting 100 per cent Euthatal or MS 222-Sandoz into the heart and then fixed and preserved in a 10 per cent solution of formalin through injection and immersion. Wet specimens were usually wrapped in muslin dampened with preservative and stored in polythene bags, small glass phials (in the case of larger insects) or plastic containers, in which they were despatched to identifying institutions. Some birds and small mammals were preserved dry as skins by Menzies, and a number of larger specimens were prepared as skeletal material, either as skulls or in their entirety. Before skeletal material was prepared, measurements of the full carcass were made. Some crania and mandibles (mainly deer and pig, but also cuscus, cassowary and some fish) kept by the Nuaulu as trophies were obtained where possible (plate 1.7), and several hundreds more were measured. Most small invertebrates were preserved partially or wholly in 15 : 1 formalin or (by preference) in 70 per cent alcohol. Most Lepidoptera, Coleoptera and other insects were preserved dry, and in the case of molluscs only shells were retained for subsequent identification. A few endo- and ecto-parasites of larger species were collected separately in formalin. The specimens were identified at the Natural History Museum in London, the Biology Department of the University of Papua New Guinea in Port Moresby and at the National Institute of Biology in Bogor, in which institutions they are also deposited.

Photographic records and sound recordings were obtained whenever practicable, and for some groups (e.g. fishes, large mammals and birds) these have been important for subsequent identification and analysis. Many more specimens were examined and then discarded or released than were preserved. In particular, I was not willing to entertain large collections of Seramese avifauna which might involve the gratuitous destruc-

Table 1.1. *Total number of animal specimens collected and examined listed according to major phylogenetic groups and periods of fieldwork*

	1969–71[1]	1973	1975	1981	1986,1990	Cumulative total
Mammals	33(20[2])	2	8	–	–	43(20)
Birds	3(53)	–(48)	3(57)	–(6)	–(8)	6(172)
Reptiles	73(10)	–(11)	45(1)	–(2)	–(1)	118(25)
Amphibians	38(6)	–(6)	14(27)	–(1)	–	52(40)
Fish	–(31)	–(7)	–(6)	–(2)	2(40)	2(86)
Total vertebrates	147(120)	2(72)	70(91)	–(11)	2(49)	221(343)
Crustaceans	–	–	3	–	7	10(–)
Insects	55(23)	22(–)	139(–)	2(–)	26(–)	244(23)
Molluscs	17(7)	2	21	–	2	42(7)
Other invertebrates	–(26)	–(3)	3(32)	–	2	5(61)
Cumulative total	219(176)	26(75)	236(123)	2(11)	39(49)	522(434)

Notes: 1. The first figures in each column refer to actual specimens collected, preserved and deposited in reference collections. The figures in parentheses refer to all additional specimens (approximate numbers only) examined and then released, or discarded, or observed at close quarters in their natural habitat. 2. Mainly captured as game in traps or during hunting.

tion of an environment which is already threatened by excessive logging and indiscriminate commercial bird-hunting. Though officially protected, the salmon-crested cockatoo, *Cacatua moluccensis*, is actively hunted for sale, as are black-capped or purple-naped lories (*Lorius domicella*). The endemic long-crested myna *Basilornis corythaix* and Forsten's oriole, *Oriolus forsteni*, are uncommon to rare, and probably endangered [Amir and Wind, 1978]; while the Moluccan scrubfowl, *Megapodius wallacei*, and the Nicobar pigeon, *Caloenas nicobarica*, are seemingly also threatened [White and Bruce, 1986: 170].

Table 1.1 shows the total number of specimens examined from various phylogenetic groups collected in the field. A relatively small number of specimens were retained for later examination and identification outside the fieldwork locality. Most were released live, some were retained in preservative and later discarded because they represented superfluous duplicates of common and easily identifiable species (e.g. *Litoria infrafrenata, Mus musculus, Hemidactylus frenatus*, or because particular species were felt to be endangered. Still others were rejected on the grounds that they were so mutilated or decomposed as to be unsuitable for further use. Also, many specimens were unfortunately lost in transit, or have since gone astray at their institutions of deposit. The figures include duplicates where earlier specimens were considered to be in poor condition, where

there was a presumption of significant racial or other taxonomic variation or where Nuaulu informants provided different terms. Small insects such as flies, bugs and beetles were often collected in multiples at a time, and given a single serial number. Consequently, the figures for smaller invertebrates are for 'lots' rather than for individual organisms. Other specimens consisted of parts of larger animals, mainly crania.

1.5 Ethnographic research procedures

Basic guidance on both the biological and ethnographic aspects of ethnozoological research procedures is provided by Bulmer [Bulmer, 1969; Bulmer, 1974]. I have been very much influenced by his sound empiricism, but have tried to augment this with the introduction of some more formal techniques. During 1969–71 the elicitation of data was prolific, but frankly haphazard and opportunistic. In the 1975 season the methods employed were more systematic. Informants were first asked to name all animal categories that they knew, irrespective of degree of inclusiveness. Both systematic zoological and cultural data were transferred to edged punch-cards (Copeland-Chatterson Paramount form CC1, 102 mm, 155 mm), prepared for each specimen, and further information added as this became available. This stored it in a way which made it compact and easily retrievable for subsequent sorting and analysis. Cards were coded directly to assist cross-checking, reference and preliminary hypothesis-testing while still in the field. The main disadvantages of these cards are that they provide no duplicate record in the event of damage and are bulky, while preparation and sorting are both time-consuming and tedious. If I were embarking on this work now I would use a lap-top computer with back-up files on separate disks or cassettes, and enter data directly in the field.

Each specimen was identified individually with waterproof ink on parchment and the label attached physically to the specimen, or in the case of small invertebrates, placed in the glass phial (if wet), or written on the envelope (if dry). Eight fields of zoological information were recorded on the upper half of the front of each accompanying specimen card: (a) specimen number; (b) English name or appropriate taxonomic status; (c) scientific name (usually added after formal identification by receiving institution); (d) form and condition of preservation; or, if discarded, reason for doing so; (e) date and approximate time of collection; (f) location and elevation; (g) short description if to be discarded, or if features are likely to alter on preservation (e.g. colouration, critical measurements, life posture, live weight); and (h) means of acquisition (e.g.

trapped, live gift). Additionally, five fields of ethnographic information were recorded on the lower half of the front of each card: (i) vernacular name of animal (if any); (j) name of informant; and (k) context of elicitation (e.g. ethnographer's house, bush). Information i–k was recorded independently for as many individual informants as possible, and in most cases for at least two. In over 50 per cent of cases I was also able to record responses to variations to the standard question frames [c.f. Berlin *et al.*, 1974: 52]: (l) 'what is X a kind of? and (m) 'how many kinds of X are there?', though I discuss below and in chapter 2 my reservations with such formulae. Any additional explanatory notes relating to data on the front of the card were placed on the reverse. Here also were written references to relevant data on this and related specimens documented elsewhere: on magnetic tape, film or in chronological field notebooks. Coding was accomplished in the usual way by punching combinations of holes along the edge of the card. Most of the analysis has been conducted on data in this form, although in 1987 all existing card records where transferred to a computer database using the same number of fields. This has permitted a final checking of the data which appear here in tabular form.

My Nuaulu work has involved a strategic combination of formal methods of elicitation and an observational and conversational approach in settings that were as nearly natural as possible. While I have always tried to be systematic wherever possible, I have also been blatantly opportunistic when I have felt that the occasion has merited it. I have experimented with more formal approaches using a relatively small number of informants in Rohua village, but have throughout put great emphasis on interpreting results contextually. Although systematic responses and specimens were obtained from only a relatively small number of Nuaulu informants, general ethnozoological data arose from interactions with numerous individuals in Watane, Bunara, Aihisuru and Hahuwalan, as well as Rohua. Data on the identification of specimens and discussions of classification and zoological knowledge were also accumulated on photographic film and sound-recording tape. The latter included conversations about animals, classification, behaviour, uses and general lore, verbatim records of identifying sessions, song, myths and stories, and other information relating to zoological knowledge. In some cases such conversations involved the ethnographer as a participant; others consist of long stretches of free discourse about animals. Some recordings are of calls for different species made in natural habitats and imitation calls and decoys produced by Nuaulu informants.

Permanent records of interviews were put on tape wherever this was physically possible. Information which could not be obtained during the examination of specimens or through general conversations with informants was committed to page-numbered duplicate notebooks in the usual way. As well as obtaining whole zoological specimens, artifacts manufactured from animal parts or associated with social and economic uses of animals were collected for subsequent analysis.

I found it useful to employ a number of simple introductory picture books [e.g. Tweedie, 1970] to stimulate talk and to compile initial lists. Even pictures of quite unfamiliar animals proved helpful in setting up hypothetical tests to highlight significant criteria and configurations used to assign animals to particular categories, and the extent to which particular categories could be manipulated. Thus, the rhinoceros hornbill of Malaya and the Sunda islands (*Buceros rhinoceros*), quite different from the species found of Seram, was still, without any doubts, assigned the term **sopite** applied to the local hornbill (*Rhyticeros plicatus*). It was with more uncertainty that the Malayan tapir was labelled **maisan** (variously lion, tiger, elephant), none of which Nuaulu had ever seen.

In 1975, 150 × 100 mm picture cards were prepared of animals with which the Nuaulu were known to be familiar from earlier fieldwork. Each card featured a clear and detailed illustration of one representative of a species reproduced from various studies of regional fauna. This was accorded a code number (top right) and in the top left-hand corner was placed the English gloss, scientific name, Nuaulu name, and Ambonese Malay or standard Indonesian equivalent. The cards were divided into two series. Series 1 contained 42 cards with coloured illustrations of all the major common faunal types that I judged the Nuaulu to be familiar with. Series 2 contained 40 cards with mostly black-and-white illustrations of less familiar (but nevertheless common) forms, for the most part consisting of invertebrates. The types varied from representatives of particular species known from the Nuaulu area (e.g. *Felis catus*, the domesticated cat) to generalised life-forms distinguished at the level of phylogenetic order or above (e.g. star-fish, butterfly). Like the picture-books, these cards served as useful stimulation for discussion and for informal and critical demonstrations of how Nuaulu principles of classification operated, with respect to hypothetical cases presented by unfamiliar species. They were also used as indicators of the kinds of specimens that the investigators were interested in collecting, and were employed on a limited and controlled basis in tests on more inclusive categories.

The drawback of using cards or other pictures as stimulus materials,

and for tests, is in the use of representations of animals rather than the real thing, which means that occasionally the cultural images projected may be quite misleading. Pictures, for example, do not show motion (often a critical feature), colours are often 'unnatural', and animals are seldom the correct size, even relative to one another. In other words, the images have been decontextualised. Furthermore, the criteria used by informants are often not those employed by the informants themselves. Since the work of Heider, 1972 and others, we have hopefully become more aware of the considerable problems of using card tests with unsophisticated and often illiterate informants.

Much will be said in this monograph about the relationship between techniques of elicitation and results, but a preliminary word must be said here about three general matters: the use of formal question frames, formal tests of classifying behaviour, and the role of the literate mode both in the offerings of those interrogated and in the interpretations of the interrogator.

1.6 Question frames and elicitation

I first employed formal question frames out of a certain naive faith in their efficacy. As it turned out, my experience of this method has given rise to severe doubts as to its usefulness, though in the event it has provided an instructive replicatory test of the experimental conditions confronted by others. While controlled elicitation has the considerable advantage of generating large amounts of data quickly for the purpose of quantitative and comparative analysis, it is often the case that the ethnographer is demanding tasks which might otherwise never be performed [Hays, 1976; Healey, 1978–9: 363].

To begin with, the questions themselves may be culturally inappropriate. Such questions may seldom be asked except by an enquiring ethnographer and may not be readily translatable into local abstract nouns and interrogatives. The standard formulaic query as enunciated in the previous section is therefore an odd and unfamiliar one for the Nuaulu; indeed, the very idea of an abstract discussion of animal classification is alien. For example, it would not make a great deal of sense to ask 'what is **nakatua wekae** (the red-sided eclectus parrot, *Larius roratus*) a kind of', when the answer is **nakatua**, since the question encodes the answer. It is therefore either redundant or has an inbuilt bias. On the other hand, the question 'what is **asu** (dog, *Canis familiaris*) a kind of?' is culturally inappropriate because it is never, ordinarily, thought of as a 'kind of' anything, except perhaps 'animal'. Yet again, the question 'what

is **asuwan** (cassowary, *Casuarius casuarius*) a kind of?' can generate a whole range of possible answers, no one of which is more 'correct' than any other [Ellen, 1972]. Similarly, to ask an informant how many types of an animal there are is likely to invite an answer where (in a strict taxonomic sense) none is possible. An informant, out of simple courtesy, because the situation demands it and through the creative use of dualism as a linguistic feature, may provide the name of the most closely related animals he or she can think of, and in this circumstance *relationship* can be defined in morphological or ecological terms. In one elicitory context a monitor lizard might appear as 'a type of crocodile', and an earthworm 'a type of snake'. What is happening here is that because the question cannot be directly translated into Nuaulu, it is being interpreted as 'what animals are most similar to X?' Thus, not only are such questions generally misleading, they tend to produce large amounts of supplementary information, and results which appear to suggest a general taxonomic ordering of categories.

As Werner and Fenton [1973: 571] point out, the question-and-answer method tends to control an informant's output and responses. In other words, it is important to be conscious of the interaction between informant and ethnographer, to understand the dynamics of the research process itself. It is vital to appreciate the effects of asking particular questions, in particular ways, of presenting a particular image of the researcher to the researched, which will provide unintentional cues and an artifactual situation which the informant will respond to. Fieldwork is a two-way process, involving constructions being put upon words, attitudes and deeds; it involves reconstruction and building of images. Data are not simply extracted from mindless informants, they emerge from an interaction between researcher and researched. Researchers select questions, and divide up the answers in ways which suit them; informants select the kind of answers they want to give, and may be reluctant to give negative answers which might reflect badly on them. The researcher clearly has an effect on his or her own conditions of research, and may sometimes unwittingly become the consulting specialist to the protagonists themselves. After several sessions in which Menzies had demonstrated his clear abilities in discriminating between different species of frog, he was asked, in all seriousness, whether a particular specimen was a **teteye**. In such a situation informants respond *as if* answers could be correct or incorrect in the sense understood by the ethnographer.

All of this is compounded by language competence problems. I am still not fluent in Nuaulu and much of my early work was conducted using

Ambonese Malay. I tried to use Nuaulu as much as possible, but often mixed it with Ambonese Malay. Classification is so much part of language that not to use a vernacular and linguistic structure to distinguish nomenclature and evaluate semantic reference is virtually impossible [Conklin, 1962]. On the other hand, ability to understand the structure of a language may be more important than fluency. Indeed, a certain probing naivete, coupled with extensive caution and reflexivity may be more insightful in the long run.

1.7 Formal tests of classifying behaviour

In order to obtain further information on Nuaulu use of more encompassing categories, and in order to examine the effects of using such methods under fieldwork conditions, I applied for the duration of the 1975 fieldwork phase two card-sorting tests: a simple sorting test and a triads test. The first was administered to 30 respondents in several villages. In both cases, subjects were quite clear before undertaking the test about the form of life depicted on each card. There could, at least, be no confusion as to what the pictures represented. Before conducting the tests all cards used were thoroughly examined by, and discussed with, informants and the Nuaulu name of each animal depicted emphasised. On occasions when subjects seemed slightly dubious as to what the pictures represented, they were reminded. Nevertheless, it is impossible to say for certain that the form of the cards and the pictures, the postures of the animals, the absence of real-life scale, and indicators of habit and behaviour did not affect the decisions subjects arrived at. The individuals tested ranged in age from 15 to 65, and were exclusively male. Three had had some elementary schooling, but were barely literate. Twenty six came from Rohua, two from Watane and two from Bunara. The triads test (in which subjects were presented with animal cards in threes and required to sort them into two groups on the basis of their similarity) was administered to just five mature adult male subjects from Rohua. Females were reluctantly eliminated from the sample on the grounds of the immense difficulty in encouraging them to participate at all.

Such tests are designed to be administered to individual respondents under laboratory-type conditions, and these conditions are met only with difficulty in the field, both practically and cognitively. The very idea of this kind of test, involving the sorting of cards or paper slips, is totally foreign to the experience of most Nuaulu, although some had been introduced to playing cards (**aise topu**, lit. 'to play gamble') during the Pacific war,[8] and to cardboard dominoes. The hazards are well known,

and have been remarked upon before in the context of ethnobiological studies [e.g. Hays, 1976: 495]. Indeed, Iako (the **ia onate Matoke**) had to go away and think about the 'test' before undertaking it: he had never been confronted with anything quite like it before. For Iako, the performance of the test represented an obvious creative effort on his part, a serious struggle to 'order' his knowledge in a way which had apparently not occurred to him before. This does not mean that such tests can never serve any useful scientific purpose, and some of the best work in cross-cultural psychology has involved the careful design and execution of appropriate tests [e.g. Cole *et al.*, 1971; Lancy and Strathern, 1981].

In my own work, informants were presented with cards representing animals they might reasonably be expected to be familiar with. After ensuring that they recognised each of the animals, they were asked to sort the cards into 'natural' groups based on degree of similarity. The criteria used were left entirely to the discretion of the informant. Thus far the approach was much the same as the procedure adopted by Perchonock and Werner, 1969: 230, though it differs in one important respect. They write:

> We then asked if there was a name that would cover all the cards in a particular pile; the word named established a subset in our taxonomy. After each pile had been named, the informant was asked to subdivide each pile, and this process was continued until the finest possible subdivision had been achieved.

Thus, what Perchonock and Werner succeeded in doing (at least judging from their own description) was encoding into their results a structure determined by the instructions they had given to their informants. These were the minimum instructions necessary to generate (inevitably) a taxonomy, namely the command to subdivide successively. In card-sorting tests, respondents are *required* to make discriminations which are 'unnatural': they will (for example) place in separate groups items which they would rather put in a slow gradation. Informants will do most things if you ask them, and the human mind is sufficiently flexible to 'rewrite' classifications in a taxonomic form, to rely entirely on binary discriminations, or upon morphological criteria, depending on implicit prompting.

Tests are much influenced by the physical and situational conditions under which they are performed, by an informant's understanding (or *mis*understanding) of what is expected of them, by differential degrees of literacy and cultural familiarity with the cognitive and material basis of the test. Some studies have not been entirely honest in facing up to such difficulties, as Heider [1972] has pointed out.

Firstly, the number of groups into which cards are sorted may depend

on factors such as the size of the space available on which to lay them out. When performing tests it is best to spread cards over a surface so that none are hidden, after first randomising the order by shuffling.

Secondly, performance may also be affected by what I call the 'prejudice of prior conception'. By this I do not mean 'pre-conception', but rather the tendency that having first made a decision on the basis of one criterion (implicit or explicit), the subject will simply adopt the same approach throughout, on the principle or least effort. This may be highly situationally determined, and on another occasion the subject may perform in a quite different way. This may affect whether or not a subject is a 'lumper' or a 'splitter', and what criteria are used (morphology, habitat, food, and so on). The implications of the prejudice of prior conception will depend on the physical features of the cards and pictures and the order in which they are encountered, rather than the animals that are supposed to be represented. And no amount of randomising can prevent this effect. It is, if you like, a kind of ordinal or temporal Rorschach effect, in which patterns are found in the most random of sequences.

Thirdly, the test forces respondents to make decisions, for example in terms of the allocation of the card to one group rather than another, which violate what they may innately feel to be the 'real situation'. Thus, subjects are compelled to choose between the logic which arises from the rules, media and dynamics of the test situation, and what their experience tells them is culturally appropriate. Thus, *a* must be placed in group *A* or *B* – it cannot be placed in both – or in between them. Similarly, once it has been placed in, say, *A*, it is not possible to indicate that *B* is divided into at least two (less inclusive) groups, one of which surely should contain it.

The respondent is not only required to make choices in a way which forces his or her conceptions of the relatedness of animals along only one path, the test situation requires that *choices be made*, pure and simple. It is not just the case that subjects may only be able to make one of several culturally possible choices, they may not want to make choices at all. In such situations we have to be aware that 'covert categories', for example, might be created as an artifact of the test situation. Sometimes the only cultural applications of such categories are in the very tests which are designed to find them. The triad test is particularly vulnerable in this respect, and Taylor, 1990: 44–7 has dealt with some of the problems. In the end, I rejected triad tests as being too problematic a tool for finding culturally regular patterns of classifying. However, they did serve as a useful stimulus game, to confirm certain tendencies established in other

ways where agreement among subjects was unanimous. They were also useful in a negative sense, when expected criteria were *not* employed, and for the intriguing comments from informants that certain forms in a triad were 'too distinct' or 'too close' to be subdivided further.

Despite all this, I administered the major test in such a way that subjects' uncertainties and desires were recorded. In many cases, test performance was heavily interspersed with ordinary conversation, and my notes on the results of such tests were accompanied by detailed annotations. In some cases, entire conversations incorporating such tests were recorded on magnetic tape (1975). Certain basic conventions were employed in recording test results. All cards were recorded by their number, and subjects' groupings indicated in alphabetical order. Thus, an individual sorting into 10 piles would have them listed A to J, and for an informant using only 5: A–E. Obviously, there was no presumption that group *A* of one informant would correspond to the *A* of another, and this was seldom the case. Within major groups, animals that subjects indicated were linked by a special affinity were bracketed, and those whose membership of the class was thought to be doubtful or peripheral were placed in parentheses. Thus, the result of a test by one informant looked as follows:

J: 9, 85, 10, 5, 68, 62

K: 83, 12, 37, (62)

Fourthly, subjects were sometimes frustrated at the absence of cards for animals which they felt should be present and which they wished to include. Presumably, they regarded them as salient. Thus, one subject wished to place 60 (a cicada) in the same group as **kinoi** (Anthribid beetles), but was unable to do so as this card was not present. In the end card 60 was allocated to a group of its own.

As far as possible, I administered the test to individuals, but in many instances there were onlookers. Even if there had not been, I have evidence that some subjects discussed 'answers' before or after administration of the test.

Another artifact arising from the physical structure of the test situation was that subjects often tended to place a card in a group based on its resemblance to the one deposited immediately beforehand. This is another instance of the hegemony of the prejudice of prior conception. It is also a tendency encouraged by the cards being presented as a pack or

pile, that is, in an order. It is avoided by spreading the cards out on a flat surface. Thus the resulting group reflected no particular category that the subject employed, but rather a group composed of a series of animals, in which physically adjacent animals are regarded as having greater resemblance than uppermost cards of other piles into which they have been sorted. I am convinced that this effect is responsible for some of the more startling 'findings'. Thus, **notu** (a frog) might be placed with **mita waene** (freshwater shrimps) on the grounds that these are both animals occupying a similar habitat, whilst **kauke** (most orthopterans) will be placed with **mita waene** on purely morphological grounds, as the largest exoskeletal invertebrates. Of course, **kauke** is thus (indirectly) linked to **notu** through association with **mita waene**. On other grounds I would say that this was extremely unlikely. In general such tests bring out an often artificial classification, one biased towards single criteria (though these may vary), rather than cognitive prototypes.

There are clearly problems with all tests of this kind, and these have in some cases affected our vision of how classifying takes place in different cultural settings. However, at the very least, they remain an extremely valuable stimulus material, may suggest new queries, help to formulate and test new hypotheses, indicate the basic dimensions of variation, and shed light on important diagnostic characteristics. We may, however, doubt their usefulness as a basis for generating reliable quantitative results, or as a device for establishing the main arrangements of categories.

1.8 The conventions of the literate mode

Formal tests are no more than a special instance of the 'literate mode', and a major problem with much work on folk-biological classification is that it has given insufficient attention to the way in which this has affected the way we describe 'classifications', particularly in terms of the connection with the scientific taxonomic tradition. Ethnobiologists have tended to arrange, categorise and formalise native classifications *as if they were* consistent with literate forms of communication and tradition [Goody 1977: 53], as reflected in their assumptions about the suitability of tabular representations, binary oppositions, charts, lists and diagrams. But – although literate cultures by no means have the monopoly on graphic representation – there is good reason to believe that the 'observed' uniformities of folk classification are in part produced by their transmission to paper and by perceiving them as an instance of this mode. For example, many questions of the *kind of*

variety only becomes significant when written down, the relationship implied being quite different when illustrated graphically or in writing [*Ibid.*, 105].

The consequences of literacy for folk classifications are now well-enough understood, though it does sometimes seem that the essential connections between different research activities are not being made. Literacy and the accompanying process of classroom education brings a shift towards greater abstractedness, towards the contextualisation of knowledge [Bruner *et al.*, 1966: 62; Goody, 1977: 13]. Nuaulu animal classifying is highly contextual and less reflective than comparable processes in literate cultures, binding ideas to events rather than to other ideas. People classify and name in varying situations, when many other activities may also be going on. By contrast, the written record simplifies storage (as it must do) by more abstraction, by pre-coding and by limiting the kinds of connections possible at any one point in the text. It comprises names only arranged in relation to each other (above, below and to the side), sometimes connected by lines or other devices, which make location, enumeration and rearrangement much easier. But, at the same time, literacy effectively emphasises the arbitrariness of the relationship between names and signs, so that we might reasonably expect the distinction between terms and taxa to be more important in scientific schemes. Quality is reduced to quantity through loss of semantic contact with the non-textual world. Only with the arrival of modern computer database management systems are we able to approach in text the kinds of classificatory connections possible in the human brain. Put differently, the *n*-dimensional possibilities of representing classificatory space mentally, or in terms of the internal wiring of the brain, are reduced to three, or more usually two, dimensions in the graphic representations on the printed page or computer monitor. The behavioural act of writing makes what is mental material, what is temporally sequential synchronic, preserving speech and thought over time to form a potentially permanent record.

As Goody [1977] has pointed out, writing, particularly alphabetic literacy, permits more intensive and qualitatively different scrutiny of discourse and its manipulation. The alphabet itself powerfully crystallises the possibilities of auditory ordering, while the list increases the visibility and sharpness of categories, assists the 'chunking' and hierarchicalisation of information critical for much recall. A written list is bound to be more comprehensive than an oral one, and as the technology of writing improves – from physical inscription through the invention of movable

type to word-processing – so more comprehensive listings are possible to the point where the total accumulation of stored 'knowledge' is infinitely in excess of human ability to make use of it.

In short, writing sets apart the components of speech and assists 'backwards scanning' in such a way that visual impact of the word gives rise to a different cognitive potentiality than oral communication [Goody, 1977: 41, 102, 111, 128]. It establishes – as Goody [1977: 106] puts it – 'the victory of the over-generalised schema'. Not only does the literate mode extend oral and mental capacities, it transforms speech itself, changing the way in which the oral mode operates to such an extent as to make it subservient. Negatively, it may reduce the ability to recall and the role of memory. By permitting the inspection of wholes never before accessible at any one moment, the written text thus reveals contradictions in classifications. Such contradictions are livable-with in oral culture, but become problematic in the literate mode. So once cross-cutting animal classifications are written down, there is strong pressure to modify them in ways which eliminate the contradictions. Perhaps most significant of all, given our present concerns, literacy reifies the classification itself, at the very least making what was once implicit explicit, transforming process into thing and revealing 'a classification' as a distinguishable and separate cultural trait.

Increasingly, many of the populations studied by ethnobiologists are literate or partially so. This is certainly the case for the Tzeltal groups studied by Berlin and Hunn, while Brown and Chase [Brown and Chase, 1981: 4] actually interviewed literate bilingual Juchitan Zapotec children on school premises. It would be surprising if this was not affecting their classifications of animals, through cross-language interference and the ability to produce long lists. A simple test of the adequacy of getting non-literate informants to list all the animals they know as an index of their zoological competence, is to list all the birds *you* know at any one point in time. Inevitably, you will find (a) that later you can add to this list – you may forget many the first time around, and (b) on checking against an ornithological handbook that you are familiar with many more birds than appear on your original list. Of course, this is not be be compared with the ability of a non-literate informant directly. The ratio of immediately retrievable knowledge to deeply-stored knowledge will not be the same, the encoding process for animal names is different in literate and non-literate informants, while literacy will tend to give greater priority to more inclusive terms such as life-forms. Some attempt to measure the impact of literacy and its associated traits, on subjects and researchers

alike, must at all times be an essential feature of ethnobiological research. In conducting our enquiries we implicitly adopt the literate mode at the same time as apparently denying its purchase on the way we see the world.

2

The language of classification

'What's the use of their having names', the Gnat said, 'if they won't answer to them?' 'No use to them*', said Alice; 'but it's useful to the people that name them, I suppose. If not, why do things have names at all?' 'I can't say', the Gnat replied. 'Further on, in the wood down there, they've got no names'*
[Carroll, 1962: 225].

This chapter is about the words that the Nuaulu apply to animals: their number, morphosyntactic structure, meaning, and the factors which affect the way in which they are arranged into more inclusive categories. In order that this discussion be set within the wider context, I begin by outlining some characteristics of the language itself and the linguistic competence of Nuaulu speakers.

2.1 The Nuaulu language

The Moluccas have long been known for their extraordinary linguistic diversity [Ekris, van, 1864–5], and in the central Moluccas alone it has been estimated that there are about 50 languages [Stresemann, 1927]. In the last 20 years there has been considerable updating and revision of our knowledge of Moluccan language classification. Chlenov [Chlenov, 1969; Chlenov, 1976; Chlenov, 1980] has worked through the material assembled by Stresemann using lexicostatistics, and on this basis places all central Moluccan languages (from Buru to Gorom) in a separate grouping within a South Moluccan sub-family of Maluku languages [Chlenov, 1980: 428]. More recently, Blust, 1974 has suggested that central Moluccan languages should be re-assigned to a branch of Austronesian putting

Table 2.–1. *Genetic classification of Nuaulu language in the Austronesian phylum following Collins [1980]. Examples of actual languages appear in italics.*

Austronesian Phylum	
├ West Indonesian	*Ambonese Malay*
└ East Indonesian	
Central Moluccan (Proto Central Maluku)	
├ Proto West Central Maluku	
Buru–Sula–Taliabo	*Ambelau*
└ Proto East Central Maluku	
├ East Seram	
└ Nunusaku (west and central Seram)	
├ *Kayeli*	
├ Three Rivers	
├ *Wemale*	*Nuelitetu, Waraka*
└ Amalumute	
Atamanu	
Yalahatan	
├ Piru Bay	
├ Proto West Piru Bay	
└ Proto East Piru Bay	
Amahai	also *Ruta, Soahua, Makariki*
Sepa	also *Tamilou, Haya, Tehoru*
├ Seti	
└ Patakai-Manusela	
Nuaulu	
Piliana	
Huaulu	

them closer to Oceanic languages. This he calls 'Eastern Austronesian', although more recently still [Blust, 1979] he has put them into something called 'Central Malayo-Polynesian'. While Dyen, Dahl and Haudricourt agree that Maluku languages are closer to West Indonesian and Philippines, Blust says that there is a special relationship between Pacific languages and those of Maluku and the lesser Sundas [Collins, 1980: 14]. Much of this interest stems from the importance of Central Maluku for our understanding of proto-Austronesian and its descendants. The most authoritative recent work has been that undertaken by Collins [1980], which has involved extensive and verifiable fieldwork inputs. He has come up with a classification based on phonological innovation, genetic rather than lexicostatistical, which (important in an ethnobiological study) does not distinguish between borrowed and inherited words [Collins 1980: 27]. It is upon the work of Collins that I have relied here.

The formal classificatory position of Nuaulu is set out in Table 2.1. Among the languages of Seram, Collins places Nuaulu together with Manusela as descendents of Nunusaku, the proto-language of west and

central Seram. The justification for doing so is that, unlike languages to the east, neither Manusela nor Nuaulu have merged **d/D* and **z/Z* with **R*, **j*, or **l*. By contrast, as with the more westerly languages, **d/D* and **z/Z* display a single reflex distinct from **l*, **j* and **R*. [Collins, 1984: 112; but see also Loski and Loski, 1989].

The Nuaulu of south central Seram form approximately half of the total number of speakers of the 'Nuaulu' language, labelled by Stresemann, 1927 [p. 7 and map] 'Patakai' and by Holle in 1939 [Stokhof 1981: 69] as 'Fatakai'. The remainder live in and around the vicinity of Oping and Rumaolat on the north coast near Sawai, around Seleman Bay. The dialects of the northern and southern groups, separated by the mountainous spine of the island, differ in their treatment of the reflexes of **j*, **l* and **R*. Also, in southern Nuaulu, **w* is retained only before low vowels *a* and *e*. For Bolton [Bolton, 1990: 3] the dialects are mutually unintelligible, though in my experience Nuaulu themselves report the language to be the same.

2.2 Multilingualism

The Nuaulu currently live in a linguistically diverse environment, with immediately unrelated languages spoken in close geographical proximity. This cannot always have been the case. Apart from Nuaulu, the longest established languages in this area are those of the Proto East Piru Bay group: Amahai, Sepa and Tehoru, and these may have diverged from each other within the last 500 years. The languages of Jalahatan, Hararu and Awaiya are more recent arrivals still. The general dispersal of these languages is attributed by Collins [1980: 55] to the seventeenth and eighteenth centuries, being connected with the migrational consequences of punitive colonial expeditions. This at least is implied in oral traditions. The Jalahatani, say, for example, that their village is 200 years old. In 1869 Wallace [Wallace, 1962 (1869): 271] said that the Awaiya had only recently settled from the interior.

In 1970 most of the adult population of Rohua (that is those over 15 years of age) were bilingual in Nuaulu and Sepa. Some spoke languages other than these. Table 2.2 shows the numerical distribution of language ability in the population of Rohua at the time of my survey in 1970.[1] Beginning at the top, the list indicates, in broad terms, the order in which languages are acquired. However, in some cases another language (say Jalahatani) may be acquired before Ambonese Malay, and even Sepa, if it is literally the mother tongue or that of another close relative.

It can be seen that women are less likely to have multilingual skills than

Table 2.2. *Numerical distribution of effective multilingual skills, Rohua 1970. M: male, F: female. Data on age and sex structure of the population is presented in Ellen 1978b: 224.*

		0–15		16–30		31–45		46–60		61–80		All ages		Both sexes
		M	F	M	F	M	F	M	F	M	F	M	F	
1.	Nuaulu only	25	22									25	22	47
2.	Nuaulu, Sepa	4	6		2	2	9	2	4	2	1	10	22	32
3.	Nuaulu, Sepa, Ambonese Malay	23	20	19	20	10	1	2		1		55	41	96
4.	Nuaulu, Sepa, Ambonese Malay + one other			2			1					2	1	3
5.	Nuaulu, Ambonese Malay + one other					1						1		1
6.	More than four languages							1				1		1
7.	**Total population**	**52**	**48**	**21**	**22**	**13**	**11**	**5**	**4**	**3**	**1**	**94**	**86**	**180**

men, especially involving Ambonese Malay (hereafter generally abbreviated to AM). However, as women are more likely than men to be incomers from other language groups, they often show skills in other local languages. Apart from Sepa, which has historically been an important lingua franca in this part of south Seram, their knowledge of Seramese languages is less. The important exception is where women have married in from villages speaking different languages, for example Jalahatan. Men usually have contact with more places. Looked at by age, older people are less likely to be fluent in AM, and (especially men) more fluent in local languages other than Sepa. Old women are least likely to have practical multilingual skills. Young children pick up AM quickly (and in the cases where they have attended school this is entrenched). There is a substantial core of the Nuaulu population who are trilingual: in AM, Sepa and Nuaulu. In table 2.2, the languages labelled 'other' (in order of significance) are: Jalahatan (2 speakers), Nuelitetu (1 speaker), Kei (1 speaker), Amahai (1 speaker), Manusela (1 speaker). By 1981 Endehnese and Butungese had been added to these skills, following in-migration from the homelands of these languages.

AM is used in all contacts with government officials above the level of the raja and his various assistants in Sepa. In such contexts it switches to something approaching standard Indonesian, through the substitution of obvious colloquialisms and Ambonese words. However, this dialectal shift is limited. AM is also used between villagers wherever there is no other common local language, such as between 'pela' partners. Between Nuaulu speakers it may occur in connection with government business, as the reported speech of others, and as verbatim chunks in some Nuaulu stories and songs.

Sepa (there are only slight dialectal differences between the languages of Sepa and Tamilou) is the effective lingua franca of the south coast, as far east as Tehoru. It is used in all dealings with people from Sepa and Tamilou, in the swiddens as well as in official discourse. It features in songs and stories, and, where these involve non-Nuaulu spirits and individuals, in some seances. Jokes that are prohibited in Nuaulu may be told in Sepa with impunity.

Archaic Nuaulu does not feature in ordinary speech, and in ritual contexts is restricted to short phrases and individual words.

What is significant about multilingualism in a study of classification is that different languages are not simply a source of loan words (and therefore of loan categories) to be used as appropriate during discourse on animals, but embody quite different classificatory structures, and

principles of classification. These must be particularly influential with immigrants (such as in-marrying females), who bring with them a paralinguistic cultural apparatus in addition to language narrowly defined.

When I first arrived in Rohua, early in 1970, only one resident (Sekanima) had any writing ability, though even this was very rudimentary. The second eldest son of Komisi, government head of the village and head of the clan Somori, was at school in Ambon. In April of that year five young children attended the government elementary school in Sepa for the first time, after years of official pressure and Nuaulu resistance. The starting numbers have increased each year since then, though the dropout rate is high and the general level of literacy remains rudimentary. My own data, collected mainly between 1970 and 1975, are unlikely to have been affected in any way by the existence of this emergent sub-literati, though some of the conventions of the literate mode (see chapter 1.9) may well have intruded through Indonesian-medium governmental communiqués and their oral transmission.

2.3 On naming animals

Language is, even at its most complex and effective, unable to reflect all of the discontinuities of nature by assigning them separate words. The limits are, to begin with, a matter of information storage and recall. The human brain is restricted in the total number of discrete items it can memorize. The use of certain cultural devices – such as mnemonics – can maximize this, or even extend it (most powerfully in the written word, especially dictionaries and catalogues), but can never provide a complete inventory. Secondly, the limits are phonetic. The number of sounds human beings can produce, and the combinations in which they can be arranged, though immense, are still insufficient to cater for all discontinuities in nature. Anyway, it is arguable whether there is any requirement for humans to name all the parts of their environment.

The advantage of naming is that it ensures rapid and precise back-referral and maximizes comprehension. This need not be a social activity as we would usually understand it, though it evolves as part of a socially conditioned process. I may, for example, refer in my own memory to a person as 'Old Mutey', and may not share this name with anyone else. It is a private and jokey way of remembering a particular individual with whom I am acquainted, and of storing information about him. There is no reason why the same should not hold when it comes to knowledge we have of the biological world. An ornithologist may privately refer to a particular species she has seen on a number of occasions as, say, 'The

Crockshard owl'; which she may, or may not, contrast with 'The Mid-which cuckoo'. She may have seen this owl at Crockshard on a number of occasions and described it as such in her notebooks, for her own benefit. 'The Crockshard owl' is a description, but it is also a name. I shall consider this idea of a private lexicon of animal names further when I turn to the issue of variation in zoological knowledge in chapter 5.

But most names emerge as a consequence of sharing. In this way they facilitate synchronic communication between individuals, rather than diachronically between the same individual at two separate moments in time. The degree to which sharing takes place will vary. Labels, in this sense, are thus established through a continuous process of confirmation and redefinition; and represent a fluctuating medium of exchange in the constant renegotiation of meaning [see, for example, Salmond, 1982].

We choose to name, classify and recall various parts of the environment (a) which are economically and culturally significant, (b) which are salient in other respects, or (c) because they are significantly related to animals or plants, minerals or places which are either functionally significant or salient [Bulmer, 1969: 12–13]. In other words, we name those things which we have most need to communicate about, or which can serve as props in the process of communication and expression. We name those things to which we accord *value*. Thus, the Nuaulu name the wild pig (*Sus scrofa*) **hahu**, not least because it is their most important source of animal protein; they have a word for the Papuan hornbill (*Rhyticeros plicatus pacificus*), **sopite**, primarily because it is both visually and aurally salient; they name a particular group of butterflies **kori-kori nusi** not because these are either culturally significant or salient (compared to other butterflies and moths), but because they are found on various trees of the genus *Citrus*, which are themselves culturally important. Obviously, what is culturally significant, perceptually salient, or associated with things which are, is not always clearly distinguishable. Species may become perceptually salient because they are economically important, or because they are associated with important items of biota. Any animal lexicon is the product of a history as long as that of the population that sustains it, and that history is sufficient time for convolutions and feed-backs of many kinds to establish themselves.

2.4 Determining concatenations

During my various stays among the Nuaulu between 1969 and 1990, I recorded some 462 terms repeatedly used to describe types of animals, at all degrees of inclusiveness. Table 2.3 sets out these terms as they were

Table 2.3. *Total number of different Nuaulu animal terms obtained during successive fieldwork phases*

		1969–71	1973	1975	1981	1986	1990	Cumulative total
1	Land mammals	29	–	–	–	–	1	30
2	Bats	8	–	1	–	–	–	9
3	Birds	60	–	3	–	–	–	63
4	Turtles	4	–	–	–	–	–	4
5	Lizards and related forms	22	–	–	–	–	–	22
6	Snakes	16	–	–	–	–	–	16
7	Amphibians	7	–	–	–	–	–	7
8	Fish and marine mammals	52	–	–	–	14	7	73
9	Insects	117	6	7	1	–	–	131
10	Molluscs and cephalopods	36	–	–	–	3	–	39
11	Other invertebrates	65	2	1	–	–	–	68
12	Total	416	8	12	1	17	8	462

obtained over a number of different periods in the field. One of the advantages of spreading fieldwork over a number of separate periods has been to allow the provisional analysis of data and their subjection to new queries and confirmatory enquires on subsequent visits. Successive fieldwork periods have provided an opportunity for checking dubious pronunciations, transliterations and meanings. Although it is generally the case that diminishing returns in the number of additional categories or terms documented can be some indication that the point of exhaustion has been approached, it is my experience that some new situation – a different informant, or an encounter with a previously unvisited biotope – will yield a sudden unexpected rush of fresh information when matters were looking pretty complete.

It has to be said, however, that the numerical presentation of such data can conceal a host of problems and misleadingly implies a degree of finiteness and accuracy which is, in fact, virtually impossible to attain in practice. To say that I have recorded 462 'terms' thus requires some qualification.

By 'a term', in this context, I refer to a label with lexemic status which is shared by ten or more persons, and is used by them repeatedly to refer to a particular species, variant of a species, or group of species, displaying certain characteristics. By this, I exclude:

1 terms which are obviously in free variation with other terms;
2 private terms, or terms shared by only a few individuals (and where I assume that the proportion of such terms that are ever likely to attain a wider circulation is small);
3 unincorporated borrowed terms;
4 *ad hoc* descriptions;
5 synonyms (including nicknames); and
6 developmental terms and terms for sexual types where these are not also regarded as distinct natural kinds.

Such considerations as these must make us constantly wary of computing total inventories of terms in particular biological domains for particular populations, since the variable inclusion of terms under the preceding six headings may have some significant statistical influence, misleading in any cross-cultural comparison. Moreover, it raises the crucial *conceptual* problems of the 'total inventory', and what it is that we mean by a 'term'. Rather than treat the inventory as some kind of objective record of the extent and character of corporate community knowledge for various animal groups, it must be viewed honestly as the sum of the partial knowledges of a number of individual informants. This knowledge is sometimes expressed as that of the 'ideal speaker–hearer' [Werner and Fenton, 1973: 540]. However, great care must be taken in using a concept of this kind, since not only is information on categories applied likely to be less than exhaustive for both any one individual and the group as a whole, but the sample may in other ways be statistically unrepresentative of the total community. More accurately, we might distinguish between: (1) *minimum core knowledge*, being the total number of terms, categories or species known to all adult speakers (m), and (2) *maximum theoretical knowledge*, being the total number of terms, categories or species reported (M). $M = m + [x(1), x(2) \ldots x(n)]$ where $x(1)$, $x(2)$ and so on represent the specific unique knowledges of particular individuals, related to variation in knowledge, situation, context. $M - m$ would therefore provide us with an index of the degree of variability in zoological knowledge for any specified population. Informants chosen may be particularly knowledgeable in some areas and not others, and categories elicited may differ not because informants vary in the degree to which they apply labels to natural species, but because of the context in which names are elicited by the ethnographer.

In compiling the lists used here I have tried to take these various points into account. The inventory is of all names repeatedly elicited for categories

at all degrees of inclusiveness other than the unique beginner for a culturally defined domain. But the completeness of an ethnozoological list and the possibilities for achieving this are related to the problems of the very notion of complete. It also begs the question as to the validity of the unit used to compile the 'complete' list. This applies generally to classificatory theory [Ellen, 1978a: 146–7]. Broadly, lexica reflect the natural fauna, although in all cases the number of terms fall short of the total number of species recorded by professional zoologists for the local macrofauna. Such problems as these are clearly important in comparative work of the kind Cecil Brown has undertaken [Brown, 1985: 44], but they have yet to be effectively dealt with.

2.5 Free variation

Like all language users, the Nuaulu vary amongst themselves in the ways they pronounce individual words. Since the population is below 1000, and no one settlement (at least if we confine ourselves to the southern seaboard) is more than five km distant from any other, dialectal differences are negligible and are not discussed further here. It is likely that prior to resettlement dialectal variation was greater, since the clan hamlets (although inter-marrying) were dispersed over 100 square kilometers of mountainous and thickly forested terrain, divided by major rivers. One hundred years of living in close proximity has led to greater uniformity, although the legacy of these old dialectal differences may be found in certain synonymous usages and in variable pronunciation.

I have ignored variation in pronunciation due to speech defects, and subtle differences that can only be expressed in a narrow transcription. However, variation remains. I have felt compelled to indicate this since I have not always been able to assume that one variant is more common than another. Sometimes different variants may be used on different occasions by the same individual.

If two free variants differ by one or more adjacent morphemes being either deleted or added, I have simply enclosed the variable parts of a lexeme in round brackets, as in **mara(ne) tina totue**, a kind of Pyralid moth; or in the optional binomial for needlefish, **(ika) sonu**. Terms can also vary by *replacing* one phoneme with another. Thus, the term which is used focally for the white ibis *Threskiornis* may be rendered either **moinapu** or **muinapu**. In this case, and where there are two or more variable elements that vary independently, variants are listed one after the other.

One common source of free variation is through the contraction of

terms or parts of terms by eliminating the noun marker. Most uninomials labelling polytypic categories can be contracted to a prefix as follows:

tekene > teke
snake
marane > mara
phalanger
kauke > kau
grasshopper
manue > manu
bird

These prefixes may be attached to various qualifiers to form binomial noun phrases:

teke patona
mara osu
kau nimunone

Depending on the qualifier, the specific shape of the prefix may alter. For example, **niniane** ('centipede') may be contracted to **nini** or **ninia** and **nikenuke** ('millipede') to **nike** or **nikenu**. Similarly, the prefix in some binomials formed in this way may be elided, as in **nin ikine** or **man samane**. Sometimes two prefixes and a qualifier can be strung together, as in the cuscus example **mara koko putie**, or a prefix can be linked to a contracted qualifier (e.g. **mara inete (mara makinete)**). Some uninomials, however, cannot be shortened (e.g. **asu**, **hahu**, **notu**, **puha**, **puo**, **imasasae**).

Contraction of this kind is a general syntactical feature of Nuaulu, and shows how classificatory procedures can be encoded in the word structure of a particular language. Thus, prefixes such as **mara**, **kahuneke**, **manu**, **mita**, **kapanopu**, **kau** and **nota** have a classificatory function and the extent to which they are employed may depend on context or ideolect.[2] Other occasional contractions involve omitting a qualifier in what Conklin first described as 'unproductive complex unitary lexemes'. Thus, **inae kilalante** (literally, 'mother of the honeycomb', and focally the honey bee *Apis indica*) is contracted to **inae** ('mother') or **kilalante**, and **kahuneke wala-wala** (literally 'spider of the web', a term applied to web-spinning spiders such as *Nephilia*) to **wala-wala** ('web').

2.6 Private terms, unincorporated borrowed terms and *ad hoc* descriptions

The exclusion of terms of limited circulation will automatically exclude also many terms that are borrowed on a temporary basis. For example,

there are many common species of marine fish for which there is no generally accepted Nuaulu term. In such cases available terms in AM or Sepa will be adopted, though not in any permanent sense incorporated (e.g. Sepa 'tuano' [AM 'ikan trompet'; *Fistularia petimbo*]). I do not consider these as Nuaulu terms, mainly on the grounds of their rarity in the lexicons of particular individuals, but also because if I were to do so, it would raise the problematic issue of whether terms known to people by virtue of their fluency in another language must automatically be incorporated into the animal lexicon at their disposal. On the other hand, many fish terms shared by more than 10 Nuaulu, and therefore (in my sense) *incorporated* into their lexicon have been borrowed from Sepa and AM. These are discussed further in chapter 7 (e.g. Sepa 'punu' > Nuaulu **punu**: *Cheilinus diagramma*; AM 'momar' > Nuaulu **momar**: *Decapterus macrosoma*).

The status of *ad hoc* descriptions has already been the subject of much discussion in the literature. Thus, to use the now ubiquitous examples from British English, it would not be easy for a native to confuse 'a blackbird' with the adjectival phrase 'a black bird', in an appropriate linguistic or social context. Similarly, in Nuaulu we should not confuse:

> **manu putie rei, hata isa mai**
> that white bird over there, (give) one here

with

> **nakatua putie rei, hata isa mai**
> that 'white cockatoo' (*Cacatua moluccensis*), (give) one here.

There is a similar problem with locational qualifiers. Thus, **ikae nuae** ('sea fish') is not an acceptable term, though **hoi waene** ('freshwater/river mullet') is. The elicitation of ethnozoological terms is a process which is peculiarly likely to generate such *ad hoc* terms, particularly because of its frequent reliance on contrastive techniques. In this situation, and in many non-artificial settings as well, it may be useful to talk of **nakatua metene** ('dark/black cockatoo') in contrast to **nakatua putie** ('white cockatoo'), even if no such term is a permanent feature of the lexicon. The problem is that some apparently *ad hoc* descriptions may well qualify as names, and many perfectly acceptable names have their origins in situational ad hockery. Words do have origins, even if it is sometimes hazardous to speculate just what these might be, and if we go back far enough many of them are bound to be descriptions.

More problematic, perhaps, are those terms which are not ordinarily

listed in elicited inventories, may be prompted by particular situations and would be recognised by most people as acceptable animal terms. Among these I would include **utu hahu**, **utu asu** and **utu maianane**. These are terms for the pig, dog and deer louse respectively, quite distinct forms. However, the list of possible named types of louse is greatly extendable, simply by qualifying the term **utu** with the name of a particular louse-bearing animal. All these animals are known to the Nuaulu to have species-specific lice, and they might well have occasion to generate the appropriate label, e.g. **utu marane** ('cuscus louse'), though exceedingly rarely. Similar terms may be generated for hermit crabs (**kumake**), depending on the kind of shell they are inhabiting; and for **une-une** and **etine**, the larvae of Lepidopterans and all other insects respectively. In this latter case the terms are generated by adding the larval generic to the name of an adult (imago) form. However, insofar as terms for imago forms are limited, so are terms for their larvae. I have decided to exclude all but directly elicited recurrent forms here, but the matter is arbitrary.

The entire subject of distinguishing names from expressions is complex and not yet resolved and, since even native speakers experience difficulties, may be unresolvable. Berlin *et al.*, 1973: 49 admit that they were unable to discover a simple non-arbitrary criterion for distinguishing between them. Hunn, 1977b: 26–27 does not distinguish between lexemes on a linguistic or semantic basis, although he suggests that if an investigator enquires about attributes other than those initially expressed this might help distinguish recognised names from expressions. Taylor, 1980: 113 [see also Taylor 1990: 39–40, 70] has attempted to draw up a classification of lexemes, distinguishing between words and phrasal lexemes. However, such formalism does not really solve the practical problems of recognising actual names, which in many instances must remain (in Nuaulu at least) a matter of judgement for the ethnographer in the fieldwork context. I have tried to provide a few guidelines.

2.7 Synonyms

A synonym is a term which can be used interchangeably with another to refer to exactly the same category, although the circumstances in which particular synonyms are used may be quite specific. Thus, **mitane** and **okote** ('prawn/shrimp') are in a relation of true synonymy. In this case the rules of use are absolutely precise: **mitane** can only be used in single-sex contexts, while **okote** may be used when both sexes are present. Precisely similar considerations apply to the use of the cuscus terms **mara kokowe** and **mara hanaie**, and for the same reason – that they are used

metaphorically to describe human genitalia, the shrimp that of females and the cuscus that of males. Choices between other synonyms may be occasioned more by linguistic context or pragmatism, as in choosing between **nunu mata ipole** and **nunu mata hanaie** for the shellfish *Turbo coronatus*; or degree of class inclusiveness, as in **nusi tanane** and **manu tanane** for various Pelecaniform birds. Other synonyms may be used interchangeably, but their use may not be predicated by specific conditions. These may arise from language and lexical diffusion, as with the alternative terms for elephant: **maisan** and **gaja**. Other synonyms may arise from free variation in the use of terms, for example the variants **ikae baus** and **baus baus** to refer to whales, or **mara makinete**, **mara nohue** and **mara kikune** for the male *Phalanger maculatus*.

There are 56 synonyms that the Nuaulu apply to animals, defined in these broad terms; eliminating synonymous usages which can be ascribed to free variation or optional affixes reduces this number to 27. The total proportion of synonyms of all types is therefore between 6 and 12 per cent, depending on how you calculate them. This is high. As we shall see later, synonymous usages may be among the mechanisms of lexical change.

2.8 Developmental terms and terms for sexual types

Developmental terms and terms for sexual types are generally excluded from ethnobiological inventories of 'natural kinds'. There are three exceptions to this rule, and which I adhere to in the present account. Firstly, in certain sexually dimorphic species the sexes are clearly being treated *as if* they were types contrasting with any other terminal category. This is the case for animals where the species itself is not terminologically recognised: the four terms applied to differentiate the sexual variants of the two known species of phalanger, or the sexes of the common domestic fowl. It is also the case for certain species where there is some overarching term, but where gross morphology rather than sexuality is the key distinguishing feature, as with two prominent agamids:

puo inae (♀)
[monitor lizard, *Varanus indicus*
L **puo pipane** (♂)
isa inae (♀)
[sail-tail lizard, *Hydrosaurus amboinensis*
L **isa pipane** (♂)

Secondly, and to complicate matters still further, the adjectival sexual qualifiers **pina** ('female') and **hanaie** ('male') may sometimes designate

quite separate species. Here again it is important to distinguish genuine terms from *ad hoc* descriptions. Thus, only male pigs may be referred to as **hahu hanaie**, whereas **kumte inae** is a perfectly acceptable generic term for craneflies of either sex. Thirdly, those forms covered by the English terms caterpillar, grub and maggot are treated as natural kinds, despite a perceptive knowledge of processes of metamorphosis. The terms **une-une** and **etine**, their qualified forms, and the categories that they label, are therefore included in all calculations when there is evidence to suggest that they are being used widely and consistently.

2.9 Morphosyntactic and semantic structures

Once we have agreed what terms are to be considered a legitimate part of the corpus, we can begin to look at their morphosyntactic structure. The lexemic forms found among recognised Nuaulu animal terms, derived from the original distinctions of Conklin [Conklin, 1962], are as follows:[3]

(a) Simple unitary lexemes. These are unanalysable primary lexemes [Berlin *et al.*, 1973] or uninomials [Bulmer, 1974: 13]. Terms which cannot be further semantically reduced were described to me by Nuaulu informants as **nanae man** – 'only a name', though this did not mean that they did not once have one. Unanalysable primary lexemes (such as British English 'oak') often (though not universally) indicate their semantic status as generic plurals through the addition of the suffix /e/, /ne/ or /ke/, as in **manu/e/**, **mara/ne/** and **kau/ke/**, for bird, cuscus and, approximately, orthopterans.

(b) Unitary complex or analysable primary lexemes [Berlin *et al.*, 1973]. These may be 'productive' or 'unproductive'. An example of an unproductive complex unitary lexeme is **makasisi popole**, a term used to describe various kinds of dragonfly. Here **makasisi** means to swoop – 'dive in the air and then come up again'; while **popo** is said to describe the way in which it 'copulates with the water', that is the touching of the surface of standing water with the end of the abdomen as it swoops (presumably in the act of feeding).

(c) Composite (secondary) lexemes. These may be:
(i) binomials e.g. **mara kokowe** (male cuscus of the species *Phalanger orientalis*)
(ii) trinomials e.g. **nunu mata ipole** (shellfish of the species *Turbo coronatus*)

Table 2.4. *Reduplication in Nuaulu animal terms. Obvious onomatopes are indicated by an asterisk.*

	Nuaulu term	Phylogenetic equivalent	English gloss
1.	**tui-tui**		type of small mammal
2.	**une-une**	*Capra aegagrus*	domesticated goat
3.	**kusa-kusa**		murid rat or shrew
4.	**hiko-hiko***	*Charadrius sp.*	plover
5.	**tuku-tuku***	prob. *Otus scops*	type of owl
6.	**kuna-kuna***	*Caprimulgus macrurus*	large-tailed night jar
7.	**tika poho-poho**	prob. *Dicrurus bracteatus*	Ambonese drongo
8.	**kura-kura***		unidentified bird
9.	**poro-poro***	*Litoria infrafrenata*	large green tree frog
10.	**ama-ama**	*Thrissina baelama*	small anchovy
11.	**wotu-wotu**	*Paraplotosus albilabris*	plotosid fish
12.	**eta-eta**		small silver freshwater fish
13.	**hana-hana**	*Platypleura*	type of cicada
14.	**kori-kori**	*LEPIDOPTERA*	general term for butterflies
15.	**une-une**	*LEPIDOPTERA*	general term for the larvae of butterflies and moths
16.	**katanopu sipu-sipu**	prob. *Birgus latro*	coconut crab
17.	**riko-riko**	*PHALANGIDA*	harvestmen
18.	**wala-wala**	*ARANEIDA*	spider's web

We can also distinguish:

(d) Juxtaposed uninomials e.g. **hahu-maianane** (pigs and deer collectively)

Reduplication is a prominent, if statistically infrequent, feature of Nuaulu animal names, as it is in the language as a whole. This is a feature that it shares with other Indonesian languages, with certain geographically proximate Papuan languages [e.g. Taylor, 1980: 128–9; Taylor 1990], and with Austronesian languages in general. There are 38 Nuaulu terms which are clearly reduplicated, that is 8 per cent of both terms at all degrees of inclusiveness and 10 per cent of all terminal categories (table 2.4). Some of these exist simultaneously in the reduplicated and non-reduplicated forms, as free variants [cf Taylor 1990: 34]. Most reduplicates attached to animal categories are also prominent because of their evident derivation from animal calls, especially those of birds and amphibia. Some (particularly bird names) are obviously onomatopes (e.g. **tuku-tuku**), and these have been marked with an asterisk in table 2.4. However, the proportion of all terms is far lower than that reported by Hunn [Hunn, 1977b: 84] for the Tzeltal, where the repetitive qualities of bird

vocalisations appear to be an important influence in naming practices. Some onomatopes, for example **kukue** (focally the oriental cuckoo, *Cuculus saturatus*) and **teteye** (the frog *Platymantis papuensis*), may be reduplicates, but as marginal cases have been omitted here.

To claim to provide a 'meaning' for anything nowadays is hazardous, and we may with some justice question what is 'actual' and what is metaphorical [Rosaldo, 1972]. However, it makes some sense to distinguish *intrinsic* from *extrinsic* meaning with regard to Nuaulu animal terms. Many terms, usually uninomials, do not intrinsically mean anything other than what they label, and informants could not provide etymologies (Berlin's primary unanalysable lexeme) e.g. **hahu**, **manue**, **notane**. Other uninomials are onomatopoeic, and I have just demonstrated that this is often the case where terms are reduplicated, and is more common for those animal groups with distinctive sounds than for others (birds and frogs in particular). Verheijen, 1963: 712–3 reports that 40 per cent of the 110 'standard' names applied to birds in Manggarai, Flores, are onomatopoeic. Of the 68 bird terms collected by me for the Nuaulu, seven are definitely onomatopoeic and ten are probables; that is 25 per cent of the total.

Extrinsic meanings encoded into polynomials are examined in some detail in section 2.11.

2.10 Uninomials and polynomials

The more-frequently used words of a language tend to label more salient categories and the less-frequently used words, less salient categories. In modern English these tend to be life-forms; in Nuaulu they are primary categories.

A uninomial is a term used for a particular category which is not further qualified lexically. Thus, **poso** is a uninomial, while **poso kaimarane** (the skink *Emoia cyanura*) is a binomial, and **poso kaimarane onate** a trinomial. It is important to distinguish polynomials which nomenclaturally encode a taxonomic relationship from terms which simply consist of two or more morphosyntactic segments. Thus, **poso kaimarane**, is a true binomial, since it has both the structure 1 + 1, and labels a *type* of **poso**. However, while **poro-poro** is also bisegmental, it is not a binomial, as the first segment is simply duplicated to form an onomatopoeic term for an undifferentiated uninomial. By the same token, **kori-kori inahai** (various species of moth), while trisegmental, is only a binomial; and **kori-kori tuamane anoe**, while quadrosegmental, is only semantically binomial: a reduplicated uninomial (**kori-kori**) plus a bisegmental descriptive qualifier

Table 2.5. *The lexical structure of Nuaulu animal terms plotted against main morphological groupings. Terms for terminal categories only appear in parentheses.*

		All terms	Uninomials	Binomials	Other polynomials	Optional uninomial/ binomial usages
1	Land mammals	30(28)	21(19)	11(11)	0	2(2)
2	Bats	9(8)	1(0)	8(8)	0	0
3	Birds	63(56)	44(37)	31(30)	0	12(11)
4	Turtles	4(3)	2(1)	2(2)	0	0
5	Lizards and related forms	22(17)	7(2)	13(13)	2(2)	0
6	Snakes	16(13)	3(0)	16(14)	0	2(0)
7	Amphibians	7(7)	6(6)	1(1)	0	0
8	Fish and aquatic mammals	73(69)	28(23)	54(53)	0	11(11)
9	Insects	131(115)	53(39)	82(78)	2(2)	6(4)
10	Molluscs and cephalopods	39(36)	8(7)	31(29)	4(4)	3(3)
11	Other invertebrates	68(60)	23(16)	46(46)	1(1)	1(1)
12	Total	462(412)	196(150)	295(285)	9(9)	37(32)

Note. The figures in columns 4 and 5 *include* optionals, which are also listed separately in column 7.

(**tuamane anoe**: lit. 'in the ground'). Also, we must not confuse bisegmental unitary complex lexemes such as **mui suane** (a synonym for honey bees) with binomials, or assume that a trisegmental term such as **marane tina totue** is either a trinomial or that **tina totue** (lit. 'ear leaf'; that is, 'ear lobe') is a binomial qualifier for a type of **marane** (phalanger). It is in fact a type of butterfly which happens to be called a 'Phalanger's ear'.

True binomials may take one of two forms. The first is uninomial + adjectival qualifier, as in **imasasae numa** (the common house gecko *Hemidactylus frenatus*, where **numa** is 'house'). These account for 92 per cent of all binomials. The remainder take the form classifier + uninomial, as in **man** ('bird') **kihoke**, the black-capped lory *Lorius domicella*, and where **kihoke** is not further reducible semantically. It is perhaps not surprising that 71 per cent of optional usages are of this kind, the classifier simply being added (as it were) to emphasise classificatory status. Some terms which might be assumed to have been innovated with the first structure show signs of now being treated as binomials of the second kind. Thus, in the case of **man tuamane** (applied to the dwarf kingfisher *Ceyex lepidus*), **tuamane**, meaning 'earth', qualifies **man(u)** ('bird'), although **tuamane** may also be heard by itself, without the classifier.

In table 2.5 I have included optional binomial terms among the uninomials. In most cases binomials are mandatory for terminal categories, it being impossible to use the final term alone as a name. However, of the total of 189 uninomials listed for all categories, 38 optionally occur as binomials (19 per cent), while one of the 9 trinomials is optionally binomial (11 per cent). If we consider the 144 uninomials for terminal categories alone, 33 are optionally binomial; that is 23 per cent. The flexibility encoded in optional nomenclatural usages is an integral characteristic of Nuaulu animal classifying behaviour, in stark contrast to Linnaean principles. These optional polynomial usages do not appear to be concentrated in particular areas of Nuaulu classificatory space, nor in any part of the phylogenetic spectrum, although interestingly they are absent among amphibia, lizards and turtles, and in invertebrates other than insects and shellfish. Of all Nuaulu animal terms (462), the greatest proportion are exclusively or optionally binomials (301: 65 per cent), followed by uninomials (189: 41 per cent), while only 9 (2 per cent) are trinomials. Informants are aware of these nomenclatural subtleties, distinguishing 'long names' (binomials such as **notu kere**) from 'short names' (uninomials such as **notu** and **kere**), where polynomials are optionally used.

In Nuaulu zoological nomenclature most binomials and all trinomials are optional in another sense; thus a uninomial is normally a perfectly acceptable alternative for a binomial, and occasionally for a trinomial as well, in contexts where context does not require detailed contrast with other closely related animals. For example, a particular species is referred to either as **notane** or **nota sapane**, **notane** being the term for a wider category including all bats. A uninomial may also be used to refer to the commonest member of a category, without further qualification. Thus, **imasasae** is the usual term for the common house gecko since the other named gecko, **imasasae ai ukune**, is encountered less frequently. However, the pragmatics of particular situations may sometimes generate **imasasae numa** as the 'hypercorrect' term. Such a usage may only become apparent when incidental reference to another member of the category is made, or when a specimen of it is presented. It required the appearance of *Gekko vittatus* (**imasasae ai ukune**) before it became clear that the house gecko was not always **imasasae** but sometimes **imasasae numa**. Such usages may confuse the ethnographer, suggesting variation where it does not exist and obscuring distinctions and nomenclature that do vary.

Table 2.6. *Frequency of different kinds of adjectival qualifier in Nuaulu animal polynomials (includes synonyms)*

	Semantic domain	Nuaulu qualifier	English gloss	Instances recorded
01.00	colour			63
01.01		**metene**	black/dark	16
01.02		**putie**	white/light	20
01.03		**msinae**	red	14
01.04		**masikune**	yellow	4
01.05		**marae**	green-blue	9
02.00	sex			8
02.01		**hanaie**	male	5
02.02		**pina**	female	3
03.00	habitat[1]			48
03.01		**numa**	house	4
03.02		**niane**	village	2
03.03		**ai ukune**	treetop, tree branches, far forest	6
03.04		**ai ntone**	sap	1
03.05		**ai otoe**		2
03.06		**ai atu**	treetop	1
03.07		**tuamane (anoe)**	(inside the) earth, ground	5
03.08		**nuae**	sea	5
03.09		**waene**	river, freshwater	6
03.10		**wesie**	forest	3
03.11		**hutan** (AM)	forest	1
03.12		**moti**	reef, rock (pools)	3
03.13			other	9
04.00	size			10
04.01		**onate**	large	6
04.02		**ikine**	small	3
04.03		**pukune**	short	1
05.00	relationship term			22
05.01		**(n)anae**	child	7
05.02		**inae**	mother	11
05.03		**wanu anae**	eight children	4
06.00	animals or animal partonyms			26
07.00	plants		[see table 2.7)	32
08.00	proper names			8
09.00	other			88
09.01		**unie**	spine, blade	1
09.02		**nikate**	patterned	4
09.03		**sinatane**	poison	3
09.04		**nau**	divination	2
09.05			other (including unknown)	78
				305

Key: 1. Other than those included in 06.00, 07.00 and 09.00.

2.11 Binomial adjectival qualifiers

Having established basic polynomial structures and patterns of use, it is now necessary to ask what semantic devices there are for terminologically encoding the qualifier in a 'kind of' relationship. These may be of two types:

(a) descriptive: e.g. **kinawerie msinae** (lit. 'red ant'), in the sense that red is an objective property of this type of ant;

and

(b) allusive: e.g. **(kori-kori) marane tina totue** (lit. 'cuscus ear, referring to a type of butterfly), in the sense that the cuscus ear is not a property of this kind of butterfly but a resemblance.

However, any descriptive term (marked or unmarked) implies contrast or comparison, and in this sense is also allusive.

Certain adjectival qualifiers are more frequent than others (see table 2.6). Colour terms predominate, although one might not expect this for a society with a high degree of semantic contact with its environment and a small colour lexicon. It may be that colour qualifiers are more likely to indicate *ad hoc* descriptions than definite terminal categories relating to fixed natural kinds. Indeed, this is confirmed by an analysis of those terms in which colour features. However, it is also the case that of the colour terms used, **metene** ('black/dark') and **putie** ('white/light') prevail. This is what we would expect in a culture with high semantic contact. Moreover black/white prevalence can be attributed to a general human tendency to employ binary oppositions, particularly in the adjectival components of lexicons [Witkowski and Brown, 1977: 54]. Other colours do not contrast regularly on a cross-cultural basis, presumably because 'black' and 'white' provide an absolute contrast in terms of both hue and intensity, and because 'light' and 'dark', in their verbal forms indicate opposite processes: the decrease in lightness is the increase in darkness. Obviously, the increase in 'redness' or 'blueness' does not in itself indicate a decrease in anything. Thus, in many cases **metene** and **putie** are used by the Nuaulu as 'macroblack' and 'macrowhite', that is, their meanings are extended to include 'black–blue–green' on the one hand, and 'white–yellow–red' on the other. For example, in British English we describe light-green and deep-purple grapes as 'white' and 'black', respectively, to effect the contrast, not because they resemble focal black or white. Naturally, intensity, hue and considerations of relativity will affect the content of macroblack and macrowhite in any one context.

In 48 instances habitat is indicated. In two cases, **riku wesie** and **riku ai ukune**, terms are synonymous binomials for the squash bug, *Mictis*

profana; whereas **waene** includes variant uses, such as **waene anoe** (lit. 'inside/deep freshwater') and **waene nosite** ('river/stream bottom'). Similarly, **tuamane** includes **tuaman anoe** (lit. 'inside/deep earth/ground', as in **kau tuaman anoe**, *Teleogryllus consimilis*). **Moti** includes **moti atue**. Other habitats indicated include **hatu nohue**, as in **nota hatu nohue**, cave-dwelling bats, and **ai totu kopue** ('rotten tree leaves'), as in **poso ai totu kopue** (the skink *Carlia fusca*); **ai hatai kopue** ('rotten **hatai** wood') as in **ikae ai hatai kopue**, and **ai** ('wood') as in **eti ai**, the woodworm beetle larva, *Anobium*. Two relationship terms are used commonly as adjectival qualifiers: **anae** ('child') and **inae** ('mother'). These may, of course, be used to describe literally the young of a particular form or the mature female. In this sense they do not constitute part of a name. They may, however, be used on the one hand to indicate small species which are perceptually separate, or, on the other, large species which are perceptually separate. Combined they may serve a metaphorical expression of perceived structural relations between different natural kinds, while in some cases they may entail a belief in mutual transformation (see chapter 6.5).

In the 26 instances of animal name or animal partonym qualifiers, cases where the binomial was formed by two uninomials in a transitive relationship (e.g. **poso hohone** or **ikae punu**) have been excluded, as have terms for insect larvae where the imago form is indicated in the qualifier (e.g. **eti sene**, 'wasp larva'). Examples include **poso kaimarane** ('cuscus skink'), **mita hahu** ('pig prawn'), **sisie kauke** ('grasshopper cicada'), **ikae hahu** ('pig fish'), **nunu marane** ('cuscus shellfish'). The 32 instances of plant qualifiers are listed in table 2.7.

The eight instances of proper names are mainly place names: as in the fish **ikae Pia**, where Pia is the name of both a river and a clan; the mollusc **nunu Tihun**, where Tihun is the Sepa name for the sago forest known to the Nuaulu as Somau; the prawn **mita Sepa**, as in the name of the village; and the death adder **nanate**, where this is the Nuaulu name for Sepa. There is one further clear and unmistakable reference to a clan, in the grasshopper **kau Matoke**. Whenever 'Bunara' is found (e.g. **nini Bunara**, **imanine Bunara**; species of centipede and wasp respectively) the reference is always to the larger of a pair of distinguished types.

2.12 Juxtaposed uninomials

A special word must be put in here about juxtaposed uninomials: the use of two (or more) terms labelling related animal forms to indicate a more inclusive category which includes both of them. Bulmer mentions this as a residual morphosyntactic form which Kalam terms may take, and Dwyer,

Table 2.7. *Nuaulu animal polynomials with plant name qualifiers (includes synonyms)*

	Animal term	Identification	Plant reference	Indicates
1	**nota sapane**	bat, *Pteropus melanopogon*	*Trema* sp. prob. *cannabina*	
2	**poso noha kunie**	skink, *Mabuya multifasciata*	tumeric, *Fibraurea chloroleuca*	colour
3	**peti kunie**	freshwater fish	tumeric, *Fibraurea chloroleuca*	colour
4	**ikae koa totue**	Anguillid elver	lit. 'pandanus leaf fish'	resemblance
5	**ikae uri hatae**	prob. *Caesio pisang*	variety of banana, *Musa paradisica*	resemblance
6	**ikae sinatane**	unident. fish	nettles, incl. *Laportea stimulans* and *Procris fruscens*	sting
7	**ikae hanu totue**	butterfly or coral fish	lit. 'hibiscus leaf fish'	resemblance
8	**sa sahune**	climbing perch, *Anabas testudineus*	*Pandanus conoideus*	habitat
9	**ikae tunene**	prob. porcupine fish	durian, *Durio zibethinus*	resemblance
10	**kau (mam) kahe kamane**	various mantids	*Agathis dammara*	
11	**kau hatane**	Segestid bush cricket	sagopalm, *Metroxylon sagu*	habitat
12	**kau (ni)munone**	bush cricket sp.	*Melanthera biflora* focally	habitat
13	**kau kasipi totue**	indet. bush cricket	cassava, *Manihot esculenta*	habitat
14	**kau suenie**	indet. cricket	bamboo of species *Dendrocalomes asper*	habitat
15	**rikune ari ai kanapua**	Anthribid beetle	camphor tree, *Dryobalanops aromatica*	habitat
16	**riku nasate**	Tesseratomid bug	langsat, *Lansium domesticum*	habitat, food
17	**atori nione**	stag beetle	coconut, *Cocos nucifera*	habitat, food
18	**kinapuku hatane**	sagopalm weevil	sagopalm, *Metroxylon sagu*	habitat
19	**kori-kori nusi**	unident. butterfly	lime, *Citrus*	habitat
20	**kori-kori sinatane**	unident. butterfly	nettles, see above	habitat
21	**kori-kori uri (totue)**	moth, *Lyssa docile*	banana (leaf)	habitat, food
22	**kori-kori nika pane putie**	unident. butterfly	*Anthocephalus macrophyllus*	resemblance
23	**une nusi**	caterpillar of *Lyssa docile*	lime, *Citrus*	habitat
24	**une sinatane**	unident. caterpillar	nettles, see above	sting
25	**eti hatane**	sago weevil grub	see above	habitat, food
26	**eti nione**	coconut grub	see above	habitat, food
27	**nunu tapako**	shellfish of the genus *Drupa*	tobacco plant	habitat
28	**katanopu makapotai iane**	kenari-eating crab	kenari nut, *Canarium vulgare*	food
29	**katanopu uri**	banana-eating crab	banana, see above	food
30	**hahu numte, moi numte**		*Hepatica*	
31	**man kina nahane**	bird	*Mimusops elengi*	habitat

1976b: 438, provides only one Rofaifo Enga example. Similar terms have been reported by Hays, 1983: 593 [see also Bulmer and Menzies, 1972–3; Lancy and Strathern, 1981], while Berlin and others do not appear to mention them at all. By contrast, they are a prominent part of Nuaulu discourse about animals, although as a percentage of the total terms employed they are few. For example, **hahu-maianane** is used to refer to a category which includes (exclusively) pigs and deer, the only indigenous large quadrupeds on Seram. Sometimes three terms may be strung together to form a more inclusive category. I believe the prominence of this usage to be connected with a more general feature of Nuaulu and other Austronesian languages. It is particularly common in Ambonese Malay, and syntactically may be related to the formation of 'plurals' (that is the creation of multi-member groups) by reduplication, as in 'burung-burung', birds. Juxtaposed uninomials are not always *ad hoc*, and may become permanent features of the language, as in AM:

'adik-kakak'
younger sibling-elder sibling siblings
'ibu-bapak'
mother-father parents
'nene-moyang'
grandparent-great grandparent ancestors
'om-kakak'
uncle-elder brother elder relative
'sirih-pinang'
betel pepper-betel nut betel chewing requisites

and Nuaulu:

ina-ama (inama)
mother-father parents
kakaku-waniku
elder-younger same-sex sibling all brothers, all sisters
nosa-kam-kanai
lime-betel pepper-betel nut betel chewing requisites

2.13 Talking about animals

When speaking of animals, their qualities and relationships, Nuaulu employ a discourse which can be distinguished in certain small but significant respects from other discourses. It differs both lexically and in terms of appropriate semantic relationships. Thus, there are different

words for killing an animal (**ihunui**) and for killing a human (**atoria**), for a human voice (**mo'nyom**) and an animal call (**nioke**); and for human head hair (**hua**) and bodily hair, animal feathers or fur (**hunue**). In some cases the differences amount only to slight phonological shifts, as in **anai** (human child) and **anae** (animal young). There is also a specialised lexicon for specific activities relating to animals (e.g. **atinai**, 'to hunt cuscus'; **asakaka**, 'to call a cuscus'), and many special anatomical terms (e.g. **mata hunua**, mollusc and insect antennae; **kihene**, wings and fins), in addition to about 47 such terms that humans and other animals share. Such differences help to locate and maintain separate domains (see chapter 4), not only in the interests of effective linguistic communion but also for purposes of symbolic contrast.

All languages provide a facility for explaining the meaning of particular words. This is necessary for linguistic and cultural socialisation, although the kinds of definitional semantic relationships which particular languages encode vary. Following the important work of Casagrande and Hale [Casagrande and Hale, 1964] and Werner and Fenton [Werner and Fenton, 1973], it is possible to list a number of Nuaulu semantic relations which have a bearing on the classification of biota. These are set out in table 2.8. The general types of semantic relations listed and their definitions do not necessarily faithfully reflect Nuaulu ethnosemantics, where the similarity sense is much the same as *grading*. Here I shall confine myself to some illustrations of *attribution*, *class inclusion*, *provenience* and *origination*. Some other relations will be encountered in the chapters that follow.

Animals are commonly defined in terms of their *attributes*, frequently encoded adjectivally in analysable primary lexemes, as in **kahuneke walawala** (web-spider) or **inae kilalante** (mother of the honeycomb). Attribution can also be expressed through the use of a third-person inalienable non-human possessive suffix (such as **-te** in **hahu nosi-te**, 'the pig's backside', or **-e** in **asu unu-e**, 'the dog's head'); or the non-human third-person alienable possessive clitic **nene**, as in **mau nene oko-e**, 'the snout (nose) of the cat', or **kori-korie nene inae**, 'the mother of the butterfly'. Consider also the following example. **Enu nene sokate** refers to a particular kind of container used as a vehicle (**sokate**) for ancestral spirits during a seance, in this case one associated with and physically resembling totemic marine turtles (**enu**). The same object can also be referred to by inverting the relationship: **sokate nene enu**. And this phenomenon, where each noun is seen as an equally valid attribute of the other, occurs quite commonly in Nuaulu animal classification as a way of expressing mutual inclusion. One

Table 2.8. *Some common semantic relations employed in Nuaulu zoological classification*

		Definition	Representative query	Nuaulu lexical approximation	Example
1.	*attribution*	*x* defined with respect to one or more distinctive or characteristic attributes	what are the characteristics of *x*?	**nene:** to possess/ (non-human subject)	spider : web
2.	*partonymy*	*x* defined as part of *y*	what is *x* a part of?	"	body : arm
3.	*comparison*	*x* defined in terms of its similarity to, or contrast with, *y*	(a) what is *x* similar to? (b) what does *x* contrast with?	**haenekae:** close, near **sani:** like	butterfly : moth **nakatua putie : nakatua wekae**
4.	*exemplification*	*x* defined by citing an appropriate co-occurrent *y*	what *x* has the quality of *y*?	**nene** (see above)	crocodile : fierce
5.	*class inclusion*	*x* defined by membership of a more inclusive group	what is *x* a kind of?	**nita, nai:** kind of	snake : python
6.	*synonymy*	*x* defined by its identity with another term	is there another word for *x*?	**san rei sinea:** just the same	**makueni : tui-tui**
7.	*antonymy*	*x* defined in terms of its opposite meaning	what is *x* the opposite of?	**hai:** opposite	male : female
8.	*provenience*	*x* defined in terms of its geographic provenance	where does *x* come from?	deietic forms	sago weevil : sago palm
9.	*origination*	*x* defined in terms of the forms from which it is derived	what does *x* originate from?	e.g. **rerihoni:** originates from, **ihokai:** from out of	
10.	*function*	*x* defined in terms of use	what is *x* used for?	**ainai:** to use, to put	nautilus shell : headdresses
11.	*grading*	*x* defined in terms of being almost *y*, preceding *y* or following *y*	what is *x* almost?	**sina sani:** almost the same, or **akahari:** follows	

instance, which I shall return to in the next chapter, is the relationship between the reptile categories **hohone** (flying lizard: *Draco lineatus amboinensis*), and **kasa'un** (the dragon lizard *Calotes cristatellus*). Here one is seen as a type of the other, no single term labelling a category absolutely more privileged, more inclusive, than the other.

The Nuaulu have several words which approximate the *class inclusive* 'kind of'. It is possible to use **nita** (also meaning 'way'), as in **notu nita ate**, 'there are four kinds of frog', or **nai**, as in **mainase nai tekene**, 'the Pacific boa is a kind of snake'. There is no general Nuaulu noun for natural kind, species, genus, type; and questions as to the identity of a particular form are more comfortably formulated in terms of what an animal is 'called' (**aoi**: 'to call') rather than what it is a 'kind of', supplemented by simple queries such as **sae rei?**, 'what is it?' or 'what name has it?', as in **poso rei nanam sae?**, 'what is the name of that skink?' All this suggests a merging of signifier with signified, of the name with the thing, common enough in much pragmatic day-to-day speech. From time to time, in the somewhat artificial context of direct elicitation, and once Nuaulu informants had caught on to the rather odd and specialised character of the discourse, the AM word 'jenis' might be used, as in 'ada dua jenis muria laut', or in Nuaulu **uwa jenis yapato**. AM 'jenis' is derived from Arabic 'jins' (pl. 'ajnas'), for 'category, variety, sort' [Beg, 1979: 110], in turn derived from the Latin 'genus' for kin. And so, by a circuitous route, we return to the ubiquitous use of metaphors of kinship: the concepts of siblinghood and common descent amongst related forms in classifications of the natural world. That kinship and other social relations should be used in this way to express propinquity between animal kinds should not in the least surprise us. As Edwin Ardener reminds us [Ardener, 1989: 163], 'observation and labelling of *behaviour* [his emphasis] are inseparable from the importing of socially-derived meaning'; and this applies no less when the semantic field is that of animals rather than humans.

The Nuaulu also use a relationship of *provenience*. This may be expressed in terms of deietic prepositions such as **nau**, 'in the, of the, to the (sea)', as in **enu nau nuae**, 'turtle of the sea'. But provenience may also be expressed in its quasi-temporal sense of 'originate from'. Temporal imagery (*origination*) is in a sense only spatial imagery one dimension removed. This may refer to imputed regular metamorphosis, as in **kori-kori nene inae rerehoni une-une**, 'the butterfly originates from the caterpillar'; or in the sense of mythic origin: **imasasae ai ukune rei rehokai rerihoni puo**, 'the tree gecko originates from the monitor'. These and similar statements of relationship are considered further at chapter 6.3 in

the context of general beliefs concerning transformation between different species.

Moreover, *comparison* can be employed through allusion to physical proximity, as in '*x* is near (**haenekae**) *y*', or *grading* as evident in statements such as **manu rei sina sani nakatua**, 'that bird is almost the same as a cockatoo', all the while 'nearness' and 'similarity' being expressed through genealogical metaphor. Thus, pairs of animals elicited during the card-sorting test were frequently referred to as **kakaku-waniku**, 'siblings'; and as we have seen **anae** ('child') and **inae** ('mother'), **hanaie** ('male') and **pina** ('female'), frequently occur as adjectival qualifiers in polynomials. However, we should not assume that all peoples use the imagery of resemblance in the same way. When we use the word 'boundary' we have a clear 'picture' (the word is indicative) of the relationship between two categories, but this is a convention thoroughly grounded in the overall predominance of spatial imagery in Western thought which is in itself tied to the habitual use of graphic representations and the written word. Similarly, in card-sorting tests Nuaulu informants, by being required to sort pictures into piles, were producing a set of spatial relations for talking about categories which were not ordinarily thought about in this way. Thus, although the deietic (orientational) features of language must be linked to the expression of classificatory relationships [c.f. Taylor, 1984b], how it is linked may be crucial. Although the distinction *upward: downward* occurs in ordinary Nuaulu speech, it does not occur with respect to animal and plant classification. It is only common in English classificatory semantics because it is a deietic feature of hierarchal taxonomic systems which find their ruling representations in the written word and graphic forms.

The extent to which different types of semantic relationship are employed by the speakers of a language varies. In Nuaulu, a large proportion of definitions are *compound* rather than *simple*, that is they make use of two or more types of semantic relationship. Thus, a butterfly may be colourful (**nikate**) – *attributive*; may be found along pathways on low bush – *spatial*; or may bring good luck – *functional*. Although certain idioms may be universal, the significance of particular relationships in particular languages is not, such that we may speak of significant differences in 'cognitive style' between one population and another in the types and degree to which different kinds of semantic relationship are used [Casagrande and Hale, 1964: 192]. Such styles may in turn be related to basic cultural orientations, even pattern of subsistence, political orientation or technology. Hitherto, in relation to plants and animals 'greatest

stress has been placed on those principles of classification which are the basis of taxonomic relations' [Perchonock and Werner, 1969: 229]. In considering folk biology it is necessary to realise that while taxonomic (class-inclusive) relationships may be a basic and universal way of ordering perceived reality they are not the only relation of classification, and perhaps not the most important [*ibid.*, 237]. Nuaulu language, in so far as it uses a polynomial structure for animal names and suffixes to generate plurals, stresses binary opposition, marking and dimension salience, certainly embeds taxonomy into the language. But this is only partial and it would be misleading to infer from this that all Nuaulu classifying of animals is taxonomic, or that the greater part of it is systematically so. Some languages tend to emphasise pairing and contrast more than others [see e.g. Lancy and Strathern, 1981; Tham Seong Chee, 1979], or are more obviously taxonomic [Lyons, 1968], and – just as important – some cultures classify more taxonomically than other cultures regardless of the extent to which this is encoded in their language.

Unwarranted assumptions and unrealised prompting from investigators may give the impression of the dominance of particular semantic relationships when this is not so. We must ask under what circumstances particular folk-definitions are spontaneously produced, and what the social rules governing their occurrence as a type of meta-linguistic speech event are [Casagrande and Hale 1964: 192]. Reflexiveness and the lexicon of reflexivity is related to the cultural significance attributed to such behaviour and the kinds of representations employed. The author of this book was born into a culture in which abstract classifications are important and in which the vocabulary reflects this, but there is no Nuaulu verb which can be glossed 'to classify', and certainly no noun designating *a* classification.

2.14 Conclusion

One of the purposes of this chapter has been provisionally to examine the assertion, made over two decades ago by Conklin [Conklin, 1962], that knowledge of linguistic structure is necessary for understanding the principles of nomenclature. More recently, and arguing somewhat against recent developments in classificatory studies, Taylor [1980: 185] has gone beyond the now accepted commonplace that we should first describe language in linguistic terms, to assert that 'the description of a semantic domain should be a *linguistic* description [of part of a language]' (emphasis in original). The present analysis attempts to show that in the narrow sense this is only true up to a point, and that in the wider sense it is only

true because language itself is situated *within* the social. At the trivial level, Berlin's more specific injunction that terminologies and their morpho-syntactic features are a good guide to classificatory practice is only partially true. Thus (to take a Nuaulu example of a well-known phenomenon), **mara tina totue** is not, as it happens, a composite secondary lexeme or binomial indicating a 'kind of' **marane**, but rather a unitary complex lexeme or uninomial referring to the 'cuscus ear lobe' butterfly. Nuaulu would no more classify it as a kind of cuscus than we would classify kingfishers with kings. More generally and fundamentally, it would be grossly misleading to base our model of classifying behaviour as a whole on categories encoded in nomenclature. We now know much more than we used to concerning the independence of categories from labels, the autonomous existence of 'loose labels' which may apply to different categories depending on the circumstances of utterance, the developmental primacy of categories over labels [Bloch, 1985: 27] and the discrepancies which often occur between linguistic competence and ability to recognise their empirical referents [Gratewood, 1983: 383]. A complete linguistic description is also very difficult to achieve in practice, and despite Taylor's admonishments, he himself proceeds to draw inferences based as much on classifying activities as on nomenclature [1980: 250], in which covert categories play an important role. A linguistic model is deceptively appealing because of its logic, elegance and tangibility. There is an additional danger that we may also be drawn towards favouring its determinant role precisely because anthropological discourse is itself set within a lexically-minded Western tradition, moulded by writing with its reification of the word and special consciousness of language. There is evidence that among certain peoples (e.g. aboriginal Australians) non-verbal learning strategies may be much more important, with reliance on spatial rather than lexical memory and classification. Clearly, language does not encode all classificatory relations, and can only handle some with difficulty. While names are the necessary currency of human thought and discourse about animals, and though they take on a life of their own, they are in many instances merely a means of talking about other things and relationships which are not in themselves directly accessible or subjectable to non-specialist reflexivity.

3

Processes of identification and the structure of categories

3.1 Introduction

I would like to begin this chapter by drawing a distinction between *identification* and *classification*. At one level, there is no difference between the two: both processes concern the allocation of an item to a (usually) named category, or the process by which an object is placed in a class. Both entail the matching of perceptual images, words and concepts [Ohnuki-Tierney, 1981: 453], and may operate equally in terms of unmodified sense data or their cultural representations. One logically presupposes the existence of the other [Colless, 1970: 252]. A pragmatic distinction can be made, however, in terms of the way in which Nuaulu informants assign observed animal specimens to terminal categories and the way in which categories are arranged into more inclusive groups. This is reflected linguistically in the difference between the statements:

x (an object) is a *y*

and

y is a kind of *z*

Both are relations of class inclusion but are distinguished in most languages, including Nuaulu. Thus the statement:

tekene rei mainase-nea (pointing to an animal)
that snake is a Pacific boa (*Candoia carinata*)

is one of identification, where the terminal **-nea** in this context denotes demonstrative emphasis; whereas the statement

mainase rei nita tekene oi
that Pacific boa is a type of snake too

is an abstract statement of classification.

3.2 Identifying animals in natural settings

The question as to what is a culturally appropriate identification is itself problematic. Why should the ethnographer accept one person's answer against another? Why do some informants defer to the 'correct' answers of others? To what extent should an ethnographer be permitted to generalise, to exploit rhetorically the device of the omniscient speaker–hearer to the exclusion of contrary opinions from individual persons? And make no mistake, the issues involved cannot be dismissed or peripheralised as being narrowly cognitive or ethnoscientific; they are fundamental to anthropological methodology. The process of identification is contingent upon social relations, is culturally complex, and *is* a process; by which I mean it involves an identifiable (though variable) sequence of steps rather than a one-off decision.

In real life the process of identification is seldom one that involves only one individual. The social reality of Nuaulu animal identification is that it is as much a collective as an individual exercise. Identifications are required for particular purposes in particular contexts (hunting, food preparation, gardening, or whatever), and often people will actively seek the advice of others. The experience or status of those interacting will affect the outcome of the identification. Here, for example, are some edited instances concerning the identification of bats from a larger series of similar events recorded on audio tape:

MA3 A large specimen of the fruit bat *Pterocarpus melanopogon melanopogon* was shot by Saniau on 4 August 1975. Three individuals who examined the carcass, and afterwards the skull, agreed without much hesitation that this was a **nota sapane**.

M27 A specimen of *Macroglossus* was brought into the village on 16 July 1975. At first, Bisara, to whom it was first shown, said that he did not know what kind of bat it was. Nepati identified it as a **nota suite**, although Konane thought that it was more likely to be **nota muni munte**. Komisi, who arrived at that moment and had not heard the previous remarks, said it was obviously **nota kiniku putie**. When Konane was told later of Komisi's identification, he too changed his mind and agreed that it must have been **nota kiniku putie**.

M6 A specimen of *Dobsonia viridis* was brought into the village on 13 July 1975. It was identified there by both Wata and Bisara, as **nota hatu nohue**, without knowledge as to where it had come from. The following day Nepati and Wairisa were asked independently for an identification. They both agreed that it was **nota hatu nohue**.

MA1 Two specimens of *Dobsonia moluccensis moluccensis* were shot in the Lihuru valley by Sahiane and Naunesi in the course of a lengthy hunting expedition on 31 July 1975. In an identification made near the Lihuru caves, both agreed that these were **nota hatu nohue**. Asked independently, Anarima, who had not been on the hunt, also volunteered the name **nota hatu nohue**.

M1 A specimen of *Dobsonia moluccensis* was brought into the village on 14 July 1975 by Nepati and Wairisa, who had just killed it. They agreed that it was **nota hatu nohue**. Two individuals who had not been on the hunt were shown the specimen on two separate occasions later in the day. One, Wata, said that it was **nota hatu nohue**. Another, Bisara, disagreed and claimed that it was **nota maka paluwe**.

M7 A specimen of a leaf-nosed bat, *Hipposideros ater*, had been captured in a mosquito net in Rohua village on 14 July 1975. It was at first identified by Masoli as **nota kiniku putie**, an identification which later in the day was also provided by Napwai. Four individuals, on two separate occasions, thought it was **nota muni munte**: Latulesi, Naupati, Wairisa and Retau'une. Both Wairisa and Retau'une stressed that their identification was influenced by the long ears that the specimen displayed. According to Komisi, on a different occasion, and later Sau'ute and Patiraia, the specimen was **nota hatu nohue**. Komisi, when told that others had said that it was **nota muni munte**, pointed out that the long-eared variety was simply the 'female' form of the sheaf-tailed bat, **nota tina totue**.

M15–26 These 12 specimens, together with another 16 that were unnumbered, were collected in mist nets across the entrance to a cave on the Lihuru stream. They were collectively identified by Masoli and Napwai as **nota kiniku putie**. Latulesi and Naupati thought that they were **nota muni munte**. Komisi, Retau'une, Wairisa, Sau'ute and Patiraia thought they were **nota hatu nohue**, Wairisa stressing that this was the immature form of the edible bat.

3.3 Basic categories and natural kinds

Having demonstrated empirically the existence of uncertainty, it is now necessary to ask what it is that Nuaulu agree, or agree to disagree, about, when they identify animal specimens by attaching particular labels to them, or when they group those selfsame labelled categories into more inclusive ones. To what extent do such activities rest upon, imply or require the recognition of an indigenous concept of 'natural kind', a folk concept of species? Moreover, can Nuaulu be said to share a set of basic categories which constitute the units from which all other categories are constructed, either by aggregation or by decomposition, or by both?

It has long been postulated that categories at a specified 'level', degree of abstraction or inclusiveness in folk classifications of biota are more salient than others and that these, together with the terms used to describe them may, therefore, be regarded as 'basic' [Bartlett, 1940; Berlin, 1976: 385–7; Conklin, 1954: 163; Rosch, 1978; Taylor, 1990: 52–9]. Indeed, one thing virtually all anthropologists can agree upon is that all peoples operate with an implied notion of 'basic' category. Such categories constitute the smallest biological continuities in nature which are readily perceived on the basis of numerous characters of form and behaviour [Bulmer, 1970], and their salience is regarded as evident, in part, from the

readiness with which they are elicited from informants [Berlin *et al.*, 1974: 32]. This in turn suggests their preponderance in natural conversation [Taylor, 1990: 54]. Although they may not be the first categories to be acquired by a child, they do appear to have logical primacy in the way people arrange and sub-divide categories.

In biology Linnaean species represent this basic level, but such perceptual and logical priority is derived entirely from their significance in evolutionary theory [Hunn, 1975c]. Nevertheless, Bulmer [Bulmer and Tyler, 1968] is prepared to describe indigneously recognised Kalam natural kinds as 'speciemes', while Dwyer too [Dwyer, 1976b: 443] considers the objective discontinuities recognised by the Rofaifo Enga as 'folk species'. However, the work of Berlin, Bulmer and Rosch all suggests that such basic categories may correspond to cross-culturally recognizable entities, conceptually approximating (at least in small-scale, non-industrial and pre-literate societies) to the genus concept.[1] Indeed, it is for this reason that Berlin [Berlin *et al.*, 1973: 267] has used the term *generic* to denote categories of this degree of inclusiveness, and his generic-species index is designed to demonstrate 'that the fundamental taxa recognized in folk systematics correspond fairly closely with scientifically known species'.

It is clear to me that the Nuaulu necessarily operate with a concept of natural kind, although in its linguistic appearances it is no different from that which operates in the conceptualisation of all objects. Groups of generically related unique objects are treated as if they themselves were things. Thus, 'that stone over there' (a unique object) and 'that stone over here' (another unique object) are collectively regarded as stones. Nuaulu classification of stones, human beings, plants or animals is in this sense no different. The 'thinginess' attributed to categories containing multiple unique objects must be understood as a belief that the categories have some kind of objective existence, like individual unique objects (this stone, that bird, and so on). It is not so much that this master concept is an 'internalised transformation from human social relations' [Dwyer, 1976b: 434], in the sense sometimes attributed to Durkheim and Mauss. In the imagery of human representations this is often likely to be the case, but it is ultimately rooted in a more general property of human classifying behaviour: namely conceptualisation through concretisation, the treatment of sometimes quite complex abstractions as if they were things [Ellen, 1988a].

There are some other difficulties with the conventional view. First of all, animals may be recognised as 'natural kinds', that is as interfertile,

Table 3.1. *Variations in the correspondence between Nuaulu terminal categories and phylogenetic taxonomic ranks*

	Rank	Approximate number of instances[1]	Example
1.	sex type	15	**mko metene** (♀ Chinese quail; *Coturnix chinensis lineata*)
2.	developmental stage	18	**teke panarine** (mature banded tree snake; *Boiga irregularis*)
3.	subspecific variants (including colour morphs)	7	**mainase putie** (colour morph of Pacific boa; *Candoia carinata*)
4.	species	219	**asu** (domesticated dog; *Canis familiaris*)
5.	genus	41	**lema** (mackerel; *Rastrelliger* spp)
6.	group of genera	29	**ika hahu** (dolphins; *Stenella* and related genera)
7.	family	20	**soihihi** (flycatchers; Muscicapidae)
8.	group of families	6	**kinapopote** (fireflies; LAMPYRIDAE and light-producing click-beetles)
9.	orders and groups of orders	13	**nusi tanane** (marine PELECANIFORMES; tropic birds, gannets, boobies, cormorants, frigate birds)
10.	class	5	**taripan** (HOLOTHUROIDEA; sea-cucumbers) **nuae huae** (SCYPHOZOA; marine jellyfish)
11.	group of phyla	1	**susue** (NEMATODA and other small worms)
12.	uncertain ranking and cross-cutting categories	38	
13.	total	412	

Note: 1. Crude figures for most frequent identifications within focal range. It should be noted that bias in favour of allocations to specific rank arises from restriction to focal range and because it is unlikely that the full range of applications of terminal categories are reflected in the firm identifications collected.

breeding true and sharing a common ecological niche, and yet may be transformed into other species or may be the end-product of the metamorphosis of another species. Sometimes, such beliefs are based on accurate observations (e.g. 'tadpoles' and 'frogs' being regarded as separate 'natural kinds'), while in other instances they may confound literal observations, even those well known to the Nuaulu themselves. This complex issue is discussed at length in chapter 6.

Another difficulty arises in that terminal categories do not universally apply to any one level of phylogenetic organisation (table 3.1). Some are sexes, varieties or developmental stages, although in most cases it is recognised that these do not equate to breeding populations. Thus, the

Table 3.2. *Nuaulu terminal colour morphs for sea-stars cross-cutting phylogenetic genera*

	Protoreaster	*Pentaceraster*	*Linckia*	
une msinae	+	+	−	red
une masikune	+	+	−	yellow
une putie	+	+	−	white
une metene	+	+	−	black
une marae	−	−	+	blue-green

Note: See: appendix 13.

category designated **marane** applies to all phalangers, but is divided into four named terminal categories, each of which refers to the sexual variant of two species. The species are recognised covertly, but not named [see also appendix 1, and Ellen, 1975a].

Many groups of animals, especially birds and invertebrates, are partitioned by terminal categories which apply to phylogenetic genera, families, and even entire orders and classes. Some groups have terminal categories which typically reflect a particular level of phylogenetic organisation. Thus, those for molluscs are for the most part genera (appendix 10). In other cases terminal categories even apply to living forms which are only generally related morphologically, and which are then arbitrarily grouped according to colour in a way which cuts across genera.[2] A good example of this is in relation to sea-stars (table 3.2).

Also, terminal categories may be covert. This is not to say that Nuaulu do not recognise distinct genera, species and variants where there are no names, but that they find no necessity to label them, or to do so consistently. The existence of such entities was made palpable to me by the ease with which informants were able to describe differences between types of animal which indicated recognition of separate breeding populations, while assigning to them the same terminal label. In such cases, names would sometimes be invented on an *ad hoc* basis, examples including the colour morphs of certain species of skink, and the unsystematic and occasional labelling of parasitic lice. Indeed, parasites are particularly variable. Sometimes the existence of such categories could be inferred by the suggestion that *x* was more like *y* than *z* although *z* could definitely be none other than *y*.

We may conclude that the Nuaulu have a concept of natural kind, but that it does not strictly correspond to the natural kinds of phylogenetic classification. The location of basic Nuaulu categories in classificatory

space varies from one animal group to another, according to the ranges of related species living in close proximity, and also according to context, often between different degrees of inclusiveness, with varying nomenclatural and cognitive properties [Dwyer, 1976b: 441; Rosch *et al.*, 1976]. Categories cannot be assigned 'to fixed positions within a formalised hierarchy of fixed states' [Bulmer, 1974: 24]. And it is this flexibility, inherent in all folk schemes, which has been rigorously eliminated through the demands for consistency made by the written mode, and in particular the logical and artificial contrivances of biologists and philosophers. The scepticism expressed by some observers [e.g. Waddy, 1982: 671] as to the possibility that basic units of perception might vary, arises because even phylogenetically-linked measurement is inevitably culture-bound. Surely, if we measure what is 'basic' in terms of the levels of a Linnaean taxonomic hierarchy then basic categories in any folk scheme will *appear* to shift in ways that we are likely to find cognitively uncomfortable.

Having said as much, it is equally clear that in terms of its internal structure (though not necessarily when compared with Linnaean schemes], the empirical Nuaulu evidence supports the view that the intermediate generic level of classification is that of primary importance and where greatest consistency obtains in identification. Macro (super-generic) and micro (sub-generic) levels of classification give rise to much more ambiguity and inconsistency [Ellen, 1975a: 221]. If this is so then the Nuaulu data are most pertinent to discussions by Berlin and Bulmer [Berlin, 1972: Bulmer, 1974: 21–4] on the relative primacy of specific and generic categories.[3]

I am here speaking about what people *represent* as natural kinds. My natural kinds do not exist apart from a social situation and a local ecological context (as units in the organisation of an ecosystem: Dwyer 1976b: 429). I am not suggesting some kind of genetic determinism rather than simply stating an empirical observation, that all known societies *do* tend to distinguish a set of categories (ethnospecies if you like) which correspond relatively closely to the species/genus/variety level in the phylogenetic scheme. What permits the degree of correspondence has less to do with perceptual regularities rooted in physiology than with a high coincidence in the social construction of different environmental realities related to the existence of global discontinuities underlying the appearance of natural forms. And this correspondence is at the level of *identification* rather than *classification*.

3.4 Distinctive features, cognitive prototypes and criteria clustering

If we assume for one moment that an individual in total isolation from his or her fellows is in a position to identify a particular specimen, then that individual does so in relation to a body of knowledge which Simpson, 1961: 185, mindful of professional taxonomists, has called a 'hypodigm'. This consists firstly of all the specimens personally known to, or encountered by, that individual, or at least what is *remembered* of them; and secondarily of abstract knowledge concerning categories acquired through learning from other individuals, through their own personal experience, through myth, stories and the like. The latter is usually in terms of distinctive features of the kind:

notane
bats hang upside down

or

manue
birds fly

I shall argue that the first kind of information, memorate information, will tend to be based on a generalised recall of 'gestalts' or cognitive prototypes, supplemented by the second, the use of distinctive features to confirm identifications or to tease out differences where identification between two or more similar specimens is difficult.

To be precise, such prototypes may only sometimes work on an overall analog basis, and might equally be best represented as the combination of a large number of 'qualitative sense data', many of which are either individually or cumulatively recognised by the observer as a sense group which, for him or her, seems to entail a very strong presumption of 'natural reality' [Bulmer and Tyler, 1968]. There is an equally strong presumption that multiple attributes may be *recoded* as a configuration [Hunn, 1977b: 59]. Such a model is based on the observation that real world attributes do not occur independently of each other, but have a highly correlational structure and are perceived as such. Feathered creatures, for example, usually have wings and a bill, and fly. Possession of feathers, therefore, is highly predictive of wings and a bill, so much so that we build up the reasonable expectation of all these features being present together. This expectation of clustering gives us a 'bird' prototype, and the further expectation of some lexical encoding [Brown, 1979: 793; Bruner *et al.*, 1956: 47; Rosch, 1978]. The prototypical member of a category, then, is the member which represents the maximum correlations

of attributes, and predictability of attributes, within the category. It is through such clustering that 'natural breaks' occur in the physical world which tend to be followed in the classification of objects [Hunn, 1977b: 46].

The early work on folk classification which stressed exclusively distinctive contrasting features is now much discredited, influenced as it was by componential analysis, unwarranted assumptions concerning the similarities between folk classifications and scientific taxonomies, and a failure to appreciate that there might be a distinction between classifying as a procedure and classifications as representations. Likewise, while we may accept that it is 'part of our human condition to long for hard lines and clear concepts' [Douglas, 1970: 191], the popular view in social anthropology with its roots in the Durkheimian theory of knowledge, that categorisation is effected by the arbitrary placing of clear impermeable boundaries upon a continuous environment [see for example Leach, 1964], is no longer tenable. In this view a category is defined by its place in a system of discrete units and derives its salience and meaning from its boundaries. A category, as it were, becomes defined in terms of what it is not; a paradox which Gregory Bateson [Bateson, 1973: 250–1] described as making a class a member of itself, and which can only be resolved by treating a boundary as an abstraction *from* the category rather than the other way round.

Such emphasis on the varying boundaries of categories cross-culturally has given rise to an emphasis on cultural relativism – for which we must ultimately blame Benjamin Lee Whorf – at the expense of investigating universal principles of category formation. Whilst it is undoubtedly true that in different cultures the world is categorised in different ways (from the aspect of boundary placing), the research of Brent Berlin, Paul Kay, Eleanor Rosch, Ralph Bulmer and others has provided much evidence to undermine the view of categories as 'logical bounded entities, membership of which is defined by a simple set of criterial features' [Rosch, 1977: 18]. Much of this evidence has been drawn from experiments on colour classification and empirical ethnobiological studies, and instead emphasises 'cognitive prototypes' around which categories are constructed, and which provide evidence for asserting that the world *does* in a sense contain 'intrinsically separate things' [*ibid*, 2], and is not an unstructured set or undifferentiated continuum. Thus, while it is true that categories form around prototypical members so as to be maximally differentiable from each other [*ibid*, 39–40], and which become the initial points of reference, 'categories can be made to appear simpler, more

clear-cut and more different from each other than they are in reality' [*ibid*, 3], though this reality is different from the undifferentiated continuum of, for example, Leach.

So, increasingly, identification and classification are not thought to be attained through conscious evaluation of attributes but by *practical mastery* [Bourdieu, 1977: 88]. In the Nuaulu case, such mastery relies mainly on appearance criteria (especially morphology), but also on behaviour and, in the case of certain animals, smell (stink bugs), sound (birds, frogs) or touch may also be important. It is, however, physical form and the behaviour underlying such form (such as flying with respect to birds) which predominates in the establishment of prototypes. Criteria informed by sense other than the visual tend to operate on a supplementary basis; and this applies to virtually any group of animals familiar to the Nuaulu and subjected to their classificatory scrutiny, from skinks, through birds to beetles. And while informants can readily *identify* different kinds of beetles – that is, put a name to them with a reasonable degree of consistency – they find it difficult to articulate criteria for distinguishing them, mainly because they are not normally required to do so. Only when instantaneous recognition fails, when perception is impaired (say, through invisibility) or is challenged, do they, apparently consciously, apply sets of binary discriminations. Even then there is no evidence that they proceed deductively from a general abstract model of systematic contrasts, or work with keys in which rules of dichotomous division are rigorously applied. Instead, they take it for granted that certain categories are excluded from consideration, and consider precise points of difference between the relevant residue.

An analog (pattern-matching) approach to category formation based on a concept of cognitive prototypes is, despite its emphasis on perceived natural realities, inevitably linked with the idea that many real-world objects only approximate by degrees to that prototype, while some may fall completely between them. That this fuzziness is evident in the Nuaulu case has been demonstrated by my earlier remarks on processes of identification, and will become even clearer from the discussion which follows on category extension. It is supported by the frequent occurrence of linguistic 'hedges' such as 'well, sort of', 'almost the same as (**sina sani**) ...' in ordinary speech when informants are invited to assign objects to categories on a class-inclusive basis. Of course, the only way out of this problem is – at some point – to impose a boundary, and it must be said that a weakness of the Rosch position is that it cannot explain why some categories should be more bounded than others, why boundaries should

be drawn where they are drawn, and why and how some speakers should turn relative judgements into absolute ones. It is at this point – where the arbitrary imposition of boundaries begins to facilitate cognition or underpin ideology – that the Durkheimian view of the socially-derived and morally-implicated category becomes effectively operational. And it is at this level that the abstract knowledge of which I spoke at the beginning of this section plays an obvious part, indeed such knowledge (graphic representations, orally acquired keys of significant characteristics, and such like) may often be accumulated before their actual content has been observed. This is a common feature of the more formal aspects of socialisation and education, and increases dramatically with the onset of literacy.

So, to summarise, the 'basic' categories of the previous section have a structure in which distinctive features are highly correlated, suggesting that they may be derived partly deductively from prototypes and partly inductively by the assembling of distinctive features. Certainly, there is no doubt that distinctive features are used by informants to identify animals and then assign them to more inclusive categories, but only secondarily so.[4]

3.5 Type categories and category extension

It would not be impossible to imagine a world in which animals were entirely comprehended as a set of unique elements, each a separate 'category' with its own label. Such a world exists in the realm of computer databases and sorting programs, where a single corpus of data can rapidly generate classifications which have no prior existence. But the limitations of the organic human mind demand that there be some *pre-classification* of the database: to manage a near-infinite mass of information, and to respond more effectively to day-to-day routine situations requiring classificatory processes. This pre-classification is only possible because although the components of the organic world are near-infinite in terms of human comprehension, the variety and number regularly recurring in scheduling, thinking and speaking is much less so.

Now, given that pre-classification prior to specific classifying situations is unavoidable, one simple way of ordering the animal world would be to allocate all items to specific categories, such that all are equally good members of those categories. What we find, however, is rather the reverse: a fundamental inequality in the assignation of items to categories arising from the difficulties of arriving at firm discontinuities in the natural world. Some individual animals and categories of animals are cognitively

privileged, in that they serve as nodes or markers in the classificatory landscape. Thus,

(a) categories may be constructed in general terms, where particular specimens or sub-categories are regarded as better illustrations of the category than others;
(b) categories may be defined in more specific terms, but extended to include other specimens or sub-categories which fit this category better than any other; and
(c) categories may be defined in general or specific terms, but are employed polysemously to refer to more than one category at different degrees of inclusiveness.

It is perhaps understandable that in the past these three strategies have been conflated and confused, since empirically one may sometimes look very much like another. Let us examine them in a bit more detail.

(a) The Nuaulu regard certain specimens as particular good examples of their type, an idea which is basically the same as the concept of 'type specimen' in regular taxonomic practice, and functionally similar to the logically privileged status of Wittgenstein's standard meter bar. In the same way, less inclusive categories (usually basic or sub-basic) may be regarded as particularly good examples of some more inclusive category. Logically, type categories must be the typically focal members of more inclusive categories, being structured round a typical and relatively unambiguous core and a progressively less typical periphery where actual boundaries are difficult to discern, and where items may be placed in a category simply because they are more like that type specimen or sub-category than another. This much is well reported in the literature [Berlin *et al.*, 1974: 56; Berlin, 1976: 391; Bulmer *et al.*, 1975: 19]. Under field conditions, type categories can be inferred from the frequency with which particular 'natural forms' occur as illustrations of the use of a term, their primary contexts of elicitation, the preferential use of unqualified uninomials to label them when uninomials are only optional (e.g. **imasasae** rather than **imasasae numa** used for *Hemidactylus frenatus*), and the mandatory polysemous use of a uninomial to refer to both the inclusive category and the exemplifying type-category, where all other sub-categories are referred to binomially. This latter usage is exemplified as follows:

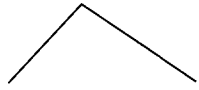
nota sapane (a group of fruit bats)

nota sapane (flying fox: *Pteropus melanopogon*) **nota maka paluwe** (bare-backed fruit bat:

→ *Dobsonia moluccensis*)

or:

sisie (cicadas)



sisie (*Baeturia* spp.) **nai sisie** (poss. *Dandubia* spp.)

Some examples of Nuaulu category extension are displayed in table 3.3. The frequency with which this classificatory device is employed varies between groups of animals. It is common for reptiles, amphibia, insects and birds; though rare among terrestrial mammals and bats. This must be explained, I think, in terms of the small number of mammals and their relative salience. In other groups, such as birds, the ratio of salient to non-salient forms is much lower and the awareness of natural discontinuities much reduced.

A type of category may be selected for its salience; it may be the most common member of a category, the most colourful, the largest or the most frequently observed type; it may be chosen because of its distinct morphology, behaviour, economic or social importance. And such criteria are not mutually exclusive. Rare species of bat, for example, were lumped together under the label used for the most common species of *Macroglossus*. On the other hand (especially in the artificial context of elicitation) a particular type category may emerge simply because it is a temporarily expedient reference point, as occurs when it is that form first mentioned in a stretch of conversation. Thus, on numerous occasions, whether the agamid lizard *Calotes cristatellus* was referred to as **hohone** or **kasa'un** depended entirely on which term was first mentioned. So **hohone** may be a type of **kasa'un** or **kasa'un** a type of **hohone**. Much the same kind of relationship exists between **mnaha** and **imanona**, where both may be equally valid for an inclusive label for murids as a whole releasing the residual label to refer to a particular sub-category, 'mouse' in the case of **mnaha** or 'rat' in the case of **imanona**. This suggests – in keeping with our

Table 3.3. *Some examples of Nuaulu category extension*

	Narrow semantic range (type categories)	Extended semantic range
1	**sote** (the pied heron, *Notophoyx picata*)	other herons, egrets and bitterns
2	**enu hunane** (hawksbill turtle; *Dermochelys coriacea*) *Caretta caretta*	green turtle, *Chelonia mydas*; loggerhead turtle
3	**imasasae** (house gecko; *Hemidactylus frenatus*)	all Gekkonidae
4	**poso** (skinks other than *Riopa* (*Eugongylus*) and *Tiliqua gigas*)	all lizards
5	**hohone** (flying lizard, *Draco lineatus amboinensis*)	*Calotes cristatellus*
6	**kasa'un** (*Calotes cristatellus*)	flying lizard, *Draco*
7	**puo** (monitor lizard, *Varanus indicus*)	*Hydrosaurus amboinensis*
8	**mainase** (*Candoia carinata*)	?*Aspidomorphus muelleri*, death adder; *Acanthophis antarcticus*
9	**notu** (*Rana* spp.)	all frogs
10	**poro-poro** (large green tree frog, *Litoria infrafrenata*)	all tree frogs (*Litoria*)
11	**kinapukune** (sago palm weevil, *Rhynochophorus bilineatus*)	all weevils, *Calliphora billardierii* and *Glycyphana perridis*
12	**kau ai otoe** (stick insects – *Platycrana viridana* and poss. related spp.)	mantids, including *Tenodera australasiae* and *Hierodula*

discussion of the previous section – that for many purposes the cognitive process involved is a perceptual one, labels being assigned relatively independently.

(b) Type category usage implies a distinction between basic and extended ranges [Berlin *et al.*, 1974: 56–8], though the reverse is not necessarily the case. Extended ranges may in some circumstances overlap. In such a model pattern-matching is not absolute but approximate, categories being extended to include specimens or sub-categories for which there may not previously have been any knowledge, to include kinds of animal new to an individual's experience [c.f. Diamond, 1966: 1104], or rare and unnamed species only encountered infrequently.

This becomes particularly clear when looking at how informants cope with the classification of species with which they were previously unacquainted. Such behaviour was shown under field conditions when the Nuaulu visited biotopes with which they were unfamiliar, when young

children were confronted with local species they had not previous seen, and when adults attempted to classify and label animals in books presented by the ethnographer. One might conclude from this that most folk classifications are almost infinitely expandable and that informants will place quite unknown species in existing categories by emphasizing a few selected feature. Only when the features are radically different or a species falls exactly between two categories does classification become difficult. In the field I used several picture books as stimulus material and was amazed at the ability of informants to place within their own classificatory system animals which they had not only never encountered, but never heard of – even the most (in their terms) bizarre. Table 3.4 lists Nuaulu terms applied to a selection of non-local fauna.

Not only do such data tell us something of the extent to which Nuaulu are prepared to extend their own categories, they also often provide clues about those distinctive features of a category which are generally shared, even if these features cannot be verbally articulated. Such experiments can be used to test the extent to which categories can be stretched and what criteria become significant. My own experience shows that the more you reach the limits of the category, the more single features become important. Respondents begin by looking for general resemblances, but end up using particular features. In this way categories are stretched: dog to include tasmanian devil, monkey to include chimpanzee. Rather than invent entirely new categories there is a tendency towards classificatory inertia, such that new categories are only invented when this becomes absolutely unavoidable.

(c) The final (more abstract) sense in which we can use the concept of type category is when it functions polysemously, narrowly referring to terminal or less inclusive categories and more broadly to refer to a group of putatively related categories of which it is also a member. Examples include the use of the term **poso** to include all lizards, rather than simply skinks, the use of the term **tekene** to include long 'legless' creeping forms other than SERPENTES, and so on. In other words, animals immediately linked by the transitive relationship 'kind of' are sometimes labelled by the same term [Berlin, 1072]. The difficulty here, however, is to know which of a pair of polysemous categories is the extensor and which is the intensor.

This characteristic of classifying behaviour has important implications in any consideration of the evolution of the systems of representations that they generate. Imagine a simple taxonomy. Taxon *a*(1) expands laterally to include *b*, and over time forms a new category *a*(2). This

Table 3.4. *Extended application of Nuaulu categories to include unfamiliar species. The stimulus materials used were colour illustrations in Tweedie [1970].*

	Nuaulu category	Normal range	Extended range	Remarks
1.	**ruka**	cercopithecoid monkeys	orangutan (*Pongo pygmaeus*)	within same sub-order
2.	**puane**	Amboina cuckoo dove (*Macropygia amboinensis*)	yellow vented bulbal (*Pycnonotus goiaver*) white-headed munia (*Lonchura striata*)	
3.	**mui numte**	unidentified kingfisher	tailor-bird (*Orthotomus* spp) magpie robin (*Copsychus saularis*)	
4.	**siseite**	Amboinan king parrot (*Alisterus amboinensis*)	red-whiskered bulbal (*Pycnonotus jocosus*)	
5.	**wekae**	red-sided eclectus parrot (*Larius roratus*)	green magpie (*Cissa chinensis*) java sparrow (*Padda oryzivora*) rose-ringed parakeet (*Psittacula krameri*)	
6.	**tinnanae**	sunbird (*Nectarinia sericea aspasiodes*)	yellow-breasted sunbird (*Leptocoma jugularis*)	within same family
7.	**konane**	Moluccan parrot (*Tanygnathus megalorhynchus*)	golden oriole (*Oriolus oriolus*)	
8.	**neune**	glossy swiftlet (*Collocalia esculenta*)	common mynah (*Acridotheres tristis*)	
9.	**suanane**	Oriental cuckoo (*Centropus*)	house crow (*Corvus splendens*)	
10.	**nusi tanane**	PELECANIFORMES	common swallow (*Hirundo rustica*) house swift (*Apus affinis*)	
11.	**tuku-tuku**	scops owl (*Otus*)	collard scops owl (*Otus bakkamoena*) japanese sparrowhawk (*Accipiter virgatus*)	within same order
12.	**sakoa**	owl (*Ninox squamipila*)	brown fish owl (*Bubu zeylonensis*)	within same order
13.	**nusi onate**	greater crested tern (*Sterna bergii*)	black kite (*Milvus migrans*)	
14.	**sote**	various Seramese herons and allies	adjutant stork (*Leptoptilus dubius*) sarus crane (*Grus antigone*)	within same family
15.	**man samane**	unidentified stork	brown booby (*Sula leucogaster*)	
16.	**saneane**	common paradise kingfisher (*Tanysiptera galatea*)	blue-winged pitta (*Pitta brachyura*)	
17.	**siori**	anchovies of the genus *Stolephorus*	murrel (snakehead fish: *Ophicephalus*)	
18.	**nai**	cicada, prob. *Dandubia*	empress cicada (*Pomponia imperatoria*)	within same family
19.	**kanopone**	all scorpions	scorpion of genus *Palamnaeus*	within same order

process may continue to more inclusive orders of classification and so *ad infinitum*. The same process may occur in reverse order, in that new forms may be seen as being sufficiently different from an autochthonous type to require special classificatory distinction. Thus, *a*(2) becomes 'true *a*(1)' and *b*, while still a type of *a*(1), is regarded as less nearly conforming to the type form. Normally, such category regression is obscured, supplemented or rejected in favour of the creation of entirely new categories which may or may not morpho-syntactically reveal their origin in a common category.

The social implications of category extension and regression are considerable, mirroring changes in practices relating to the categories involved. Thus, in the Nuaulu clan Somori totemic avoidances are extended from the reticulated python to all other snakes, and in Nepanetomoi'en from the freshwater turtle to all sea turtles (**peku** > **enu**), and from monitors to the sail-tail lizard (**puo** > **isa**), both sets of categories being paired. This would go a long way to explain the uncertainty surrounding the extent to which Nuaulu totemic avoidance applies to snakes other than the reticulate python, and the distinction which is often drawn between varying degrees of significance attached to such prohibitions [c.f. Bulmer, 1978].

It is theoretically important to distinguish category extension (and regression) from polysemy, but often difficult to separate these two technically different things in a folk-classificatory corpus. Thus, the wide sense of the term **kasa'un** (including all agamid lizards known to the Nuaulu, with the exception of *Hydrosaurus*) is a case of simple category extension, **kasa'un** > **hohone**; whereas the use of **notu** to refer to all frogs as well as a particular kind of frog is polysemy [compare Ellen *et al.*, 1976a and Ellen *et al.*, 1976b]. There are a large number of cases which could not be as easily assigned as these two. In polysemy words have two separate meanings, which can be used independently of each other, as in **manue** = bird (1), = chicken (2). This is not the case with category extension, where extended usage is dependent upon an understanding of the more restricted meaning. The secondary meaning cannot be employed without assuming a relationship with the primary meaning. Were the example of Nuaulu polysemy just mentioned to be instead category extension, the expression would have to be rewritten: **manue** = chicken (1) + other 'chicken-like' animals. It is easy to see how category extension developed into polysemy.

Sometimes, where categories ordinarily contain only two sub-categories, type category usage may be reciprocal, depending on context. We

have already encountered this in **hohone/kasa'un** and **mnaha/imanona** (rats and mice), though the same practice is sometimes extended to more than two categories. Given the series of related types:

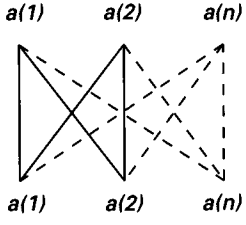
$$a(1),a(2),a(3) \ldots a(n)$$

a(1) and *a(2)* could be referred to as types of *a(3)*, *a(2)* and *a(3)* as types of *a (1)*, and so on. Thus, logically, in a taxon of *n* items there are as many initial categories to extend as there are items (figure 3.1).It is seldom the case, however, that the number of items used as type species equals (or even approaches) *n*, except where the category consists only of a pair of items. What is more common are informal usages of this kind. The selection of one of more of these items as a type category is generally on the basis of the most common term (e.g. **poso** for all lizards). It may also depend upon the context of elicitation or (normally) the context of usage, or the order in which animals are mentioned in conversation or are observed. Equally, it may derive from certain distinctive features of the selected animals (size, morphology).

3.6 Negative allocation and residual categories

In many cases Nuaulu allocate specimens to categories by excluding them from others. Thus, speaking of bats, if an informant agreed that a specimen could not possibly be included in that labelled **nota maka paluwe**, it might be allocated to **nota muni munte**, on the grounds that **muni munte** resembles **maka paluwe** in a rather general way, or rather resembles it more closely than it resembles anything else. It is important to stress that such an allocation is not made on the basis of the presence of specific features, but rather on the basis of their absence. Alternatively, a specimen that is definitely not in a specific terminal category may be given one of a number of other labels not used in any consistent fashion to identify particular phylogenetic content, but which are applied loosely. The use of various specific **poso** labels as applied to skinks is a good example of this.

Figure 3.1 Opportunistic reciprocal labelling of two or more categories.



Slightly different and more widespread is the residual use of terms indicating a single distinguishing feature, as with **kori-kori onate** ('large'), **kori-kori ikine** ('small'), **kori-kori putie** ('white'), and so on for otherwise non-salient Lepidopterans; or **mita nuae** ('sea'), **mita waene** ('freshwater') for Decapod crustaceans. This usage comes very close to the invention of *ad hoc* categories, though it can and must be empirically distinguished from it. Finally, if an informant was unable to allocate a specimen to a specific terminal category, it might find a home in a general residual category created on the basis of the contrast 'specificus : the rest'. Thus we repeatedly find statements of the kind '**poso mani**' (just a **poso**). Other terms used unqualified in this way are **kahunekete** (spiders), **kauke** (various Orthoptera), **manue** ('dicky' birds) and **kori-kori** (butterflies). In a few cases general residual categories have a more permanent and shared existence. Thus, the extensive phylogenetic content for Passerines combined with their low salience in the Nuaulu scheme of things (small birds of little use or distinction), has led to large number of genera, even families, being assigned to a small number of apparently residual categories (appendix 3). Such categories are logically different from other large categories which are not differentiated into detailed natural kinds and which have a large phylogenetic content, but where the classifer 'specificus : the rest' does not operate, as is the case with **taripan** ('sea-cucumber') or **nuae huae** ('jellyfish').

Residualing, or negative allocation, is a common response in situations where informants are presented with insufficient data and where they are constantly faced with 'new' animals, which have to be roughly sorted into categories [Taylor, 1990: 64–5]. It is also a response likely to be common in the artificial eliciting situations set up by ethnographers. Moreover, residual categories can only be fitted into a taxonomic model with difficulty, as they do not jointly exhaust the domain by partition or inclusion, they contrast with generics but are not generics, and in some ways they are like life-forms [Hunn, 1977b: 57–58; Hunn, 1982: 834–5]. But at the same time taxonomies themselves easily generate residuals as a consequence of a logical requirement to cover classificatory space exhaustively and to do so symmetrically.

3.7 Binary opposition and marking

Binary opposition or pairing underlies the distinction into focal and non-focal types, reflected in category extension, the type category notion, polysemy, residualing and marking behaviour in nomenclature [Brown and Witkowski, 1980: 36ff]. It is a feature of all folk-biological systems, as

indeed it is of all languages. This is largely because classifying commonly occurs through dichotomous division. We tend to describe it as binary opposition when it emphasises contrasting features, and as pairing when it emphasises complementarity or sameness.

At a lexical level, pairing is particularly apparent in the adjectival component of folk-biological vocabularies, already encountered here for the Nuaulu in chapter 2.11. The oppositional characteristics of certain concepts (size, colour, sexuality, parenthood and habitat) are strongly represented, and usually encoded by two terms with finer lexical distinctions only rarely present. This is because it is the simplest and most economical way of encoding a relationship. Thus, Nuaulu divide the natural environment in terms of mountain : sea, land : sea, sea : river, forest : village, house : forest, garden : forest, and so on. Not every contrast set is mutually exclusive, and the same element may appear in a number of sets contrasting with different elements, elements which are often real-world components of more inclusive categories contrasted with the same element. So, for example, 'sea' contrasts with 'river', *and* 'land' *and* 'mountain'. Sometimes such contrasts can be convincingly demonstrated to link up with an all-pervading cultural dualism revealed in accounts of cosmology, myths and ritual practices (see chapter 6.7).

Most pairs encoded in Nuaulu animal categories exemplify what we might call positive or symmetrical binary discriminations ($x : y$). The criteria of distinction employed include 'larger : smaller' (e.g. **nini Bunara : nini ikine**, **poso kaimarane onate : poso kaimarane ikine**), habitat (e.g. **poro-poro : notu**, tree frog : ground frog), colour or hue (**yapato putie : yapato masikune**, white marine eel : yellow marine eel; **mainase putie : mainase metene**, white (light) Pacific boa : black (dark) Pacific boa), sex (**nopa hanaie : nopa inae**, male : female, the skinks *Riopa rufescens* and *Tiliqua gigas* respectively), and age ('younger : older') (**teke tam niane : teke konomete**, respectively the immature and mature phases of the harmless colubrid tree snake, *Dendrelaphis pictus*). Paired forms of the kind 'larger : smaller' and those based on colour are the most common and occur most frequently among terms for invertebrates. Those based on sex and age are less common.

Pairs may sometimes be made in terms of qualities which are culturally regarded as being opposed or complementary rather than in terms of perceptually visible specific features e.g. **pina** and **hanaie** ('female and male'). These may apply to actual sex types of the same species or may serve to contrast entire species. In such cases **pina** and **hanaie** become culturally loaded macro-terms, like 'black' and 'white'. **Pina**, for example,

often refers to smaller animals. This is a folk-nomenclatural usage which Rumphius, writing in the late seventeenth century of another part of the central Moluccas, was most familiar with. On several occasions he alludes to 'males' and 'females' among shells. When dealing with species of *Cypraea* he comments: 'In discussing these shells when we speak of male and female one must not think there is a difference in sex but, as is customary, those shells which are lightest and smoothest are taken for the females'. When dealing with *Lambis lambis* he explains that in the 'males' the fingers of the peristome are rounded and closed, whereas in the 'female' they are flatter and open. This discrimination between 'male and female' was a common practice among early shell collectors [Holthuis van Bentham, 1959: 188–9]. In Nuaulu the idiom is used to distinguish two species which are generically quite distinct: *Turbo coronatus* (**nunu mata ipole hanaie**, where **hanaie** = 'male') and *Angaria lacinatus* (**nunu mata ipole pina**, where **pina** = 'female').

Other pairs may also be effected through what we might call negative or asymmetrical binary discriminations (x : not x), the cognitive means of creating residual categories and the basis of linguistic marking. Thus, **imasasae** (meaning **imasasae numa**, the house gecko *Hemidactylus frenatus*) may be contrasted with **imasasae ai ukune** (*Gekko vittatus*); **mnaha** (meaning **mnaha numa**, the commensal house mouse *Mus musculus*) with **mnaha ai ukune** (or **wesie**), various forest rats. The residual category ('the other') is a common feature of dichotomous division, and the means by which cognitively obstructive asymmetry and complexity in nature can be eliminated.

Marking is a special case of binary opposition which extends to all three components of language: phonology, syntax and the lexicon [Greenberg, 1966]. It is based [following Brown and Witkowski, 1980: 361] on implicational relationships where the implied feature is unmarked and the implying feature is marked. For example, the implicational chain for nasal consonants, $n, < m < \tilde{n}$ or n, forms a marking sequence where $\tilde{n}$ and n are marked vis-à-vis m and n, and m is marked vis-à-vis n, which is unmarked. It is frequently found in Nuaulu adjectival dyads, where the unmarked item is implied and its counterpart marked. The house/forest distinction in the division of **imasasae** and **mnaha** is a good example of this. The unmarked item is used more frequently and is therefore more salient, while the marked item it used relatively infrequently, again well illustrated by the **imasasae** and **mnaha** cases. Also, unmarked items appear in neutral linguistic environments while marked items do not; in other words they often have to be specifically prompted for. Finally,

unmarked items are phonologically or morphologically simple, whereas marked items are more complex (e.g. **hahu** 'pig' and **notu**, 'ground frog'; as opposed to **maianane**, 'deer' and **poro-poro**, 'tree frog').

3.8 Category boundaries: contrast and gradation

The principle of contrast is that property of categories which defines their semantic condition in terms of other categories of the same degree of inclusion. Berlin's [1973] approach depends on contrast but accumulated data on category extension show that items may be allocated to categories by degree. Moreover, linguistic contrast may appear to occur between categories which are not on the same conceptual 'level', as in the sentence: 'this is a **mita sanane** (kind of freshwater prawn), not **ikae** ('fish')', or in the multiple contrasts of **notu** with **inararai** (another kind of ground frog), **poro-poro** (ground frogs as opposed to tree frogs) or **manua** (frogs as opposed to birds). Similarly, categories may be divided and then subdivided without implying either contrast at each degree of division or the existence of levels. Thus we might represent a classification by a dendrogram rather than a taxonomy, or by a combination of the two. But the processes involved are not wholly the same, and should therefore be kept analytically separate.

The relationship between animal categories, particularly the less inclusive terminal categories, is frequently continuous rather than discrete. In other words, it is sometimes difficult to determine where a boundary between categories occurs. This appears to be the case, at the level of identification for example, with the categories **imanona** and **mnaha**. The former can be broadly glossed as 'rat' and includes forest and village types (appendix 1). The latter generally refers to *Mus musculus*. However, rats in the village context may frequently be classed as **mnaha**, particularly if size and morphology approximate more closely to *Mus* than to some ideal forest rat. In this case **imanona** and **mnaha** can be seen as polar types, and specimens in the middle, displaying equally the distinctive characteristics and general gestalt of both, may be subject to dispute. Consider the following identifications for rats and mice obtained in 1975:

MA2 A specimen of *Rattus sp.* was collected live by hand outside the garden house of Lohia Penisa on the Kamna'ukuna river, who identified it as **imanona**, without further qualification. Later the same day in Rohua, Komisi Somori and Howa also identified the dead specimen as **imanona**.

MA35 A specimen of *Mus musculus* was found in a spring trap laid by Menzies outside the house of Kotahatu Nepane in Rohua on 28 July. This was identified by Kotahatu as **mnaha numa** and unanimously affirmed by everyone present in the house.

MA36 A small mouse, *Mus musculus*, was trapped live by a small child in Rohua village area on 3 August. Komisi identified this as **mnahane**, although his 12-year-old son said that it was a young **imanona (imanona anae)**. There was some dispute over this, but it was finally agreed by both of them to be an immature **mnaha (mnaha anae)**.

M34 A specimen of *Rattus rattus* was trapped in Rohua on 17 July. This was at first identified by Sorita Matoke and Teliam Matoke as **mnaha niane**. Komisi Somori was approached separately and said it was **imanona ai ukune**, but later changed his mind and said that it was probably **mnaha**. Later the same day Latulesi said it was an **imanona**, but did not qualify it binomially. Sekanima Nepane and Nepinama Nepane thought that it was more likely to be **mnaha**.

M33 A specimen of *Rattus exulans* was first identified by Sorita Matoke and Teliam as **mnaha numa**. They also provided the synonymous term **mnaha niane**. Komisi thought it was **imanona** but said later that it was more likely to be a **mnaha**. Latulesi thought that it was an **imanona** but Sekanima and Nepinama volunteered **mnaha**.

M37 A specimen of *Rattus* was trapped in Ellen's house, and identified by Pela-uma as **mnaha** on account of its short head, short whiskers and the position of the mouth underneath the snout. By contrast, Saniau thought that on first glance it was **imanona**. However, on listening to Pela-uma and after having a further look he changed his mind.

There is some evidence for a similar relationship in the semantic continuum **poro-poro** < > **notu**; frogs being classified intermediately as either **poro-poro** or **notu** in terms of the degree to which they approach one or other of the poles. A different kind of semantic continuum, involving three fuzzy categories instead of two, is exemplified in the application of the skink terms **poso noha metene**, **poso noha kunie** and **poso noha ai totu kopue** [see Ellen *et al.*, 1976a].

3.9 Rank

Rank, as applied to the study of classification, is the notion that categories are ordered hierarchically according to degree of inclusiveness, and that these generate levels in a fixed relationship to each other. The universal ethnobiological scheme suggested by Berlin [Berlin *et al.*, 1973: 216] is now well-enough known, where distinctions of rank are drawn in terms of the set: kingdom (unique beginner), life-form, generic, specific and varietal, plus intermediate. Each of these ranks is claimed to have characteristics distinguished on the basis of a combination of linguistic, psychological and taxonomic characteristics: unique beginners are commonly not labelled, life-forms are invariably few in number and include the majority of named taxa of lower rank, specifics and varietals are less numerous than generics, and so on. I shall have more to say about the way categories are arranged into more inclusive groups, particularly

Table 3.5. *The lexical structure of Nuaulu animal terms plotted against rank*

	All terms	Uninomials	Binomials	Other polynomials
All ranks	462	194	298	9
Terminal categories	412	148	288	9
Intermediate categories	5	11	9	0
Primary categories	112	112	8*	0

Note: In tabulating these data I have had to make judgements regarding the more frequent and preferential usages. As is made clear in the text, it is not always possible to allocate items unambiguously to one cell in the matrix rather than another, and the figures presented include optional usages. There is, therefore, overlap between columns 3, 4 and 5, and rows 2, 3 and 4 in terms of categorical content.

* all optional

'life-forms', in the next chapter. Here it is only necessary to make some preliminary remarks on how the linked concepts of *rank*, *hierarchy* and *level* are reflected in the Nuaulu corpus.

Now, it is true that the Nuaulu rank categories. The existence of the transitive relationship 'kind of' and its lexical expression implies as much. Rank is encoded morpho-syntactically in most polynomials: **mara makinete** is less inclusive than **marane**, **nota sopane** than **notane**, **nunu mata putie** than **nunu mata**, **nunu ipole pine** than **nunu mata ipole**, and so one. Indeed, most terminal categories are binomials and all primary categories uninomials (table 3.5). Further support comes from the use of the same term at different degrees of inclusiveness. Thus, among uninomials, **notu** and **poso** (unqualified) can be used in at least four separate ways, at different degrees of inclusiveness; while, say, **puo**, **kasa'un**, **teteye** and **poro-poro** can only be used at two [see Ellen *et al.*, 1976b and Ellen *et al.*, 1976a]. There is no convincing evidence that this might be due to recent revision and extension following outside contact, as Bulmer [Bulmer *et al.*, 1975: 14–5] has suggested for the Kalam.

But the 'kind of' relationship is ruthlessly binary, in that it can only link two categories at a time. We might say that **wekae** is a kind of **nakatua**, or that **wekae** is a kind of **manua**, and that **nakatua** is a kind of **manua**; but we cannot necessarily say that because **wekae** is a kind of **manua** it therefore *follows* that it is a type of **nakatua**. The problem is compounded when, as with **nakatua** and **wekae**, categories may sometimes be used reciprocally in a way discussed at 3.5. So, it is difficult in the Nuaulu case to infer a permanently-encoded hierarchy from a string of transitive relationships. This kind of syllogistic thought is not logically privileged. Moreover, the

Table 3.6. *Classificatory load of Nuaulu animal terms*

	Classificatory load[1]	Number of terms (percentage)	Example
1.	1	67 (14.5)	**asu** (dog; *Canis familiaris*)
2.	1,2	7 (1.5)	**poro-poro** (large tree frog; *Litoria infrafrenata*)
3.	1,2,3	1 (0.2)	**manue** (birds, focally *Gallus gallus*)
4.	1,2,3,4	1 (0.2)	**kasa'un** (agamid lizard; *Calotes cristatellus*)
5.	1,2,3,4,5	1 (0.2)	**notu** (*Rana modesta* and other related frogs)
6.	2	274 (59.5)	**enu ikae** (leatherback turtle; *Dermochelys coriacea*)
7.	2,3	24 (5.2)	**inahai putie** (various kinds of white moth)
8.	2,3,4	20 (4.3)	**nopa inae** (skink; *Tiliqua gigas*)
9.	2,3,4,5	2 (0.4)	**poso ai totu kopue** (skink; *Carlia fusca*)
10.	2,3,4,5,6	6 (1.3)	**poso kaimarane ikine** (skink: *Emoia cyanura*)
11.	3	59 (12.7)	**nunu sesu nuae** (shellfish; *Latirus turnitus*)
Total		462 (100)	

Note: 1. Thus, **1** indicates that only one degree of classificatory inclusiveness is represented in the category; in other words, primary and terminal categories are coterminus. **1,2** indicates that, optionally, one or two degrees of classificatory inclusiveness are represented in the category; and so on. In most cases (86.7 per cent) classificatory load is non-optional, and is signalled morphosyntactically (e.g. **asu**, **enu ikae** and **nunu sesu nuae**).

conceptualisation of categories in terms of cognitive prototypes rather than clusters of criterial distinctions mitigates against a conventional set of multiple tiers, while deep hierarchies are difficult to sustain in an entirely oral mode, even where they are socially useful. In table 3.6 I have arranged data on Nuaulu animal terms according to the number of elements in strings of transitive relationships which the categories they label are seen to be part of. Thus, **asu** ('dog') does not obviously, and even under much prompting, enter into a transitive string other than as 'a kind of animal, living thing'. These are Berlin's 'unaffiliated generics', and have what I describe as a classificatory load of 1. By contrast, **notu** (variously frog, ground frog, a type of ground frog) may appear in transitive strings of up to 5 degrees of inclusiveness. Of all terms, 59.5 per cent occur at only two degrees of inclusiveness, reflecting mainly binomial usage, while those occurring in strings in excess of three are infrequent. Such a description takes account of relative classificatory depth or degree of inclusiveness (the vertical axis in a taxonomic representation) but implies nothing about 'level'.

While we accept the plausibility of representing the relations between 'basic' Nuaulu animal categories in terms of limited and fragmentary

hierarchies, it is difficult to see how we might go beyond this and link it consistently with the idea of *level*, in a way which has much intra-cultural credibility, let alone providing a firm foundation for cross-cultural comparison. Successive dichotomous division does not automatically provide this. The imagery of hierarchy, implying higher and lower, top and bottom, superior and inferior, with its technical associations of literate graphic representations and its social connotations of class and status, is absent from Nuaulu discourse on animal relationships (see chapter 2.10). It is neither appropriate as a *folk* representation of how the Nuaulu conceive the relationships between categories, nor does it adequately serve the purpose of comparison and generalisation from the ethnographic angle. Such remarks are in line with other observations on the Berlin model [Bulmer, 1974; Hays, 1974: 39; Hunn, 1976: 510; Randall, 1976; and despite Berlin, 1976].

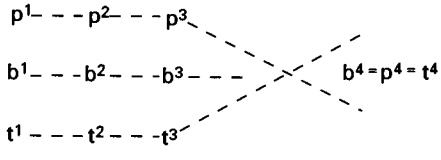
I am not convinced that the recognition of 'levels' is a useful basis for the initial analysis of conceptual organisation. The number of 'levels' is seldom 'finite and uniform throughout the system' [Conklin, 1962: 128]; some terminal categories may be extensively sub-divided, others may not be [also Taylor 1990: 60]; while 'level' implies that it is possible to make structural equivalences in terms of degree of inclusion across a wide range of categories for very different kinds of organisms, and in a way which reflects indigenous thought or representations. A taxonomic approach assumes (or imposes) spurious symmetry by not allowing, for example, cross-cutting , or terminal categories which are varietals to contrast with those basic categories that are not further sub-divided, or 'generics' to shift easily to a higher or lower conceptual plane [Dwyer, 1976b: 442]. I have already demonstrated the difficulty of delineating basic categories, and hence a basic level; and we shall see that there are also problems in defining life-forms (see chapter 4). If the existence of such levels is difficult to establish, and these are the starting points for establishing other ranks, then it must follow that ranking such levels in any systematic way is going to be even more difficult.

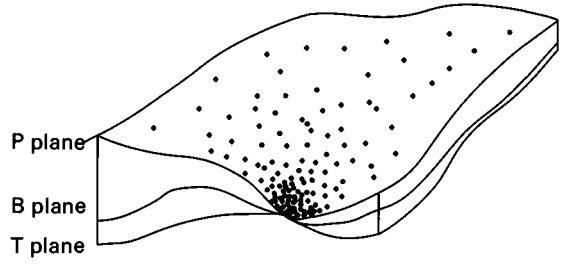
In order to describe, analyse and compare processes of classifying I have tried to employ as neutral and encompassing a set of terms as possible. Understandably, perhaps, much of the terminology adopted in accounts of folk classification is reminiscent of Linnaean systematics and a discourse situated in notions of hierarchy. We might be advised to move away from this model and its associated nomenclatural baggage on the grounds that is is loaded with potentially misleading cultural assumptions [despite Berlin, 1976: 385–7]. For this reason I have avoided, where

possible, the terms *generic* (by which I mean basic), *specifics* and *varietals*, partly on the grounds of possible terminological and conceptual confusion [c.f. also Taylor 1990: 40–1], and partly because they imply uniform cross-cultural distinctions which I feel cannot always be made.

Of course, the language of ethnographic description is never perfect, only sufficiently adequate for particular purposes, but the concepts and terms used here less obviously exclude, constrain or warp classificatory space in the ways that I have criticized. Throughout this monograph I use the phrase 'degree of inclusiveness' in preference to 'level'. Semantically, *level* is the notion that, in folk classification, categories are grouped *vertically* according to degree of inclusiveness. It therefore implies '*rank*', which is not a feature of classification that can be asserted *a priori*. 'Degree of inclusion' leaves aside the judgement as to how the categories at different degrees of inclusion are seen to be related. In some cases 'level' of categories must remain indeterminate. To indicate minimal inclusion I use *terminal category*, the indigenous unit for the most specific and exclusive natural types recognised which cannot be more simply defined in any other way. Categories characterised by maximal inclusion within a particular domain (that is excluding 'unique beginners') are *primary*. It is true that this requires accepting as *primary* categories of a very diverse kind [Hays, 1983: 597], but there is no *a priori* reason why it should be otherwise. To some extent his follows Bulmer, though I replace *taxa* with *categories* so as not to prejudge the kind of classificatory relationships

Figure 3.2 The relationship between primary and terminal degrees of inclusiveness represented as topological space.





involved. Such an approach provides a set of fixed points while minimizing implicit ethnocentrism and spurious structural equivalences.

We can represent the relationship between primary and terminal categories in terms of topological space (figure 3.2). This avoids conventional notions of distance often used to measure and represent classificatory constructs. In this representation, what we might call P categories and T categories exist on two separate planes, their relationship varying depending on classificatory depth or degree of inclusiveness. The P plane may merge with the T plane, though it can never be inferior to it. Also, the quality of the inclusive relations may alter, sometimes dichotomous, sometimes hierarchic, sometimes strictly taxonomic, sometimes paradigmatic, and so on. The classificatory space configured by P–T relations is the framework constraining the trajectory of a third (B) plane. The B plane reflects the conceptualisation of basic categories, which we have already discussed. While the B plane may itself only be weakly characterised as a 'level' it does have the advantage of a measure of shared psychological salience as an organising concept. It is certainly a less precarious point of analytical departure than an approach which operates top-downwards and which demands dangerous *a priori* judgements concerning the cognitive status of the more inclusive categories, and the implication that these reflect indigenous partitioning of mental space. Such a model also makes it easier to adopt a three-dimensional (spatial) notion of inclusiveness, rather than the explicit two-dimensionality of taxonomy. If we then tentatively move out to greater or lesser degrees of inclusiveness, we can see that the characteristics of cognitive strategy vary. As we further sub-divide the space of basic categories we do so, as a rule, on the basis of a few (often single) criteria; as we move towards greater inclusiveness we encounter categories of an increasingly gestaltic quality on the one hand (as in focal **manue**), and on the other based on excessively simple criteria, for example size or function, as in **peni** ('big game'). This latter is something which we must now examine more carefully.

4

The relations between non-basic categories

Absolute definitions of higher categories are impossible. One of the unique characteristics of the species is that it can be and is defined without reference to any other category. Definitions of higher categories can only be relative to those of other categories, specifying relative ranks in the hierarchy and set relationships to taxa *[Simpson, 1961: 196].*

4.1 Order and disorder in Nuaulu conceptions of nature

Simpson, of course, is speaking here of the taxonomic practice of biologists. Nevertheless, his remarks are highly pertinent to the examination of folk-biological classifications. I wish to argue in this chapter that even if we agree that it is possible to locate *basic* categories which have a strong likelihood of corresponding with cognitive prototypes contingent upon objective discontinuities in nature, and which therefore present a ready point of reference in cross-cultural studies, this is far less likely to be so when we are dealing with more inclusive categories. This is because it is more difficult to ensure that the categories we discover are fully contrastable, operating at the same 'level', regularly labelled, non-overlapping, and generally shared within a population. Paul Taylor [1990: 68] voices this scepticism when he rhetorically presumes that those who claim some distinctive characteristics for levels above basic categories [e.g. Brown, 1979; Witkowski and Brown, 1977] are able to identify those levels to which their generalisations apply. The difficulties seem to me to arise for two contradictory reasons. First, this is because non-basic categories are of so little practical value in small-scale rural societies with a high degree of semantic contact with nature. Secondly, it is because the artificial

character of non-basic categories (that is their reliance on relatively few distinguishing features which outrageously simplify the complexities of nature) are increasingly incorporated within more general classifications of the world and subjected to ideological manipulation.

To say that conceptions of nature (and inevitably also NATURE:NURTURE and NATURE:CULTURE distinctions) are themselves intrinsically cultural constructions, varying as they do from one society to another, is by now an anthropological commonplace. But it is because of such relativity that it becomes awkward and misleading to carve out from these constructions domains with the implied status of logically simple taxonomic and linguistic divisions within an otherwise uncomplicated and mundane universe. The Nuaulu, do, by implication, have a domain and concept of nature, or at least conceptions of nature. These acknowledge that there is (or indeed must be) order in the world, an order which is in general terms comparable to the pre-Darwinian 'great chain of being'. Non-directive evidence for this might first be sought in that part of Nuaulu origin mythology which speaks of the time when the first Matoke (Lord of the Land) descended from the sky and walked throughout the earth where each natural kind was represented only by a single organism – one house, one betel palm, one hornbill, and so on. As the Matoke came by each of these, so he named it, saying: 'This is a snake', 'This is a betel palm', 'This is a hornbill' and so on. And as he did so, the many emerged from the singular. Thus, though like Stillingsfleet the Nuaulu would find unimaginable 'a creation with void holes in it', this is not to say that they readily expound, even less agree upon, the principles for order, and certainly not the identification or classification of animals for pragmatic purposes. They will simply admit to not knowing it, or at least large parts of it. This is evident from the numerous occasions on which I was referred to elders, clan heads, ritual specialists and other individuals who were regarded as having greater access to such knowledge, and from the frequently heard statement that although they did not know, then the ancestors did. Iako, a remarkably humble individual for a 'Lord of the land' said that only the ancestors and Anahatana – the supreme being – knew about such things: he (Iako) *could not* know them. Less modest individuals might dispute amongst themselves, but every disputed classification itself exists within an axiomatic field, the coordinates of which are assumed to be quite fixed [c.f. Bourdieu, 1977: 168]. And the *primus inter pares* of axioms is that nature itself is finite, and that all animals have names – even if they remain unknown. In Nuaulu theory, at least, names are not given arbitrarily, for economy of thought; but

reveal part of an order which was laid down at the beginning of the world, but which is only partially known about, and even less understood.

Despite such disclaimers to knowledge as that offered by Iako, the Nuaulu do theorise the structure of nature. This much is implied in their symbolic and ritual practice, and occasionally protrudes into ordinary conversation. To begin with, we may if we wish say perfectly accurately that the Nuaulu distinguish between 'all things which live', those which **tane inaha(u)** (lit. 'to work the soul'), and those which do not: **tane inaha(u) tewa** (lit. 'to not work the soul').[1] But such abstract distinctions, while discernible, have little practical bearing on Nuaulu lived culture, are of no prominent symbolic significance, and certainly cannot be held to be a starting point for their classification of the natural world. In this instance, I suspect they are examples of that genre of elicited but quite ungeneralisable contrasts which are happily provided by willing informants, and at which the ethnographer is tempted to grasp in some vain attempt to impose order on what otherwise looks like utter chaos. Perhaps more representative and evidently significant is the distinction between those (inert) things which have never lived (and therefore never died), and those which die (**mata-**), become corpses (**nimoe**), decompose and release spirits. For the Nuaulu the fact of certain death is a more important criterion than birth, a significance echoed in a nodal myth which tells of the origin of death as a means of coping with the physical and social constraints imposed by immortality.[2]

So, while the Nuaulu conceptualise the world of animals in various complex and sophisticated ways, it is hard to pin down something we might call 'the Nuaulu classification of animals' which is any more than a convenient etic reification. It might be thought that since animals are, more or less, recognised as a domain then any classification of entities within that domain must constitute an animal classification. But recognising the existence of a domain is very different from agreeing the structure of its internal partitioning. In this chapter I examine the claims for recognising a Nuaulu domain of animals, and for isolating within it at its most inclusive extension a 'level' of life-form categories. I argue affirmatively for the first, but negatively for the second. Thereafter, I turn to classificatory arrangements intermediate to basic categories on the one hand, and primary categories (whether life-form or not) on the other. These are crucial in any overall characterisation of a domain structure as taxonomic, and yet are highly problematic in terms of criteria of distinction, the role of covert categories, cross-cutting classifications and adherence to expectations of transitivity.

4.2 Unique beginners: animals as a domain

It has become conventional to begin descriptions of folk classifications at the 'top', that is with some discussion of the definition of domains and conceptual and linguistic 'unique beginners'. Brent Berlin even numbers his levels from the top. This is natural enough to us. We start writing at the top of the page and work our way downwards, and we are culturally used to beginning with general categories and sub-dividing them through a process of logical deduction. This is a process reinforced by the scientific notion of taxonomy and a culturally central notion of hierarchy. But by introducing these predispositions into our descriptions of the classifications of other peoples, we more or less ensure that the more general categories are accorded a prominence and primacy regardless of the independent ethnographic evidence for ascertaining their salience. By looking at classification 'top-to-bottom', we set the agenda for a particular catalogue of 'problems' which this adopted orientation manufactures, not least of which is that there must be a 'top' and a 'bottom'. Some [e.g. Dwyer, 1976b: 435] have reacted against this by starting at the 'bottom' (or at least near it) and working upwards. This has the singular merit of at least beginning at the point where categories most clearly meet specific discontinuities in nature, but it does (of course) presume that there are 'tops' and 'bottoms', if not 'levels'. Taylor [1990: 60ff] begins in the middle. Out of respect for consistency, but for no other reason, I begin here at the top – or as I would prefer to put it, with those categories encompassing the greatest number of animal types.

Early on in my fieldwork I elicited the word **ipai** in conversations about animals. This word appears to be synonymous with **makapana**, elicited by Rosemary Bolton from informants in their mid-twenties or older. Both words are used by some Nuaulu in various ways to encompass more of the domain ANIMAL than any other term. To some extent **ipai** seemed to resemble British English polysemous use of 'animal', as in the contrasts 'animal, not human', 'animal, not plant' and 'animal, not insect'. As far as I can judge, the primary sense in which the Nuaulu employ the term (and they would, anyway, use it exceedingly rarely) is that of terrestrial animals, contrasted with those of sea and air. In this sense the focal reference type is a vertebrate quadruped. I suspect that on occasions invertebrates might be included by extension, but the context in which the term is ordinarily used by no means makes this clear. No doubt, whether or not amphibians and/or invertebrates are **ipai** is one of those matters which the Nuaulu themselves either would consider a matter for debate, or would be disdainfully indifferent to.

There is another sense in which I have heard **ipai** used, that is in contrast to **mansia**,[3] 'humans', where it appears to be used to refer to all non-human animals. I have only heard it used in this way once and would interpret it as a convenient label which in some circumstances can stand for all non-human animals, rather than being an inclusive category. In general terms, animals are regarded by the Nuaulu as being in many respects like people. Myths and other oral traditions inform us that animals, like their human counterparts, have societies. In the case of some species, they are represented as reflecting basically human organisation and values, as in a published myth of the clan Nepane-nesinopu [Ellen, 1972: 233]. Animal societies too are bound by the Patalima–Patasiwa, 'Five group' – 'Nine group', division of Seramese peoples – the Nuaulu themselves are Patalima, whilst totemic traditions and a rich mythology underscore the idea that animals may change into humans, and vice versa. In short, humans impose a social classification on the world of animals. Many terms referring to behaviour and appearance which are used for humans are also used for animals. The only exceptions occur where there is no human model, as with 'wing', 'beak', 'tail' and so on. This is wholly different from the position of plants. On the other hand, there is no linguistic distinction between human and animal classifiers, as in Malay 'orang' and 'ekor'. Taylor [1990: 51] reports that in Tobelorese language and concepts humans are treated quite differently from 'animals'. He regards this as highly problematic, since 'humans' meet the defining features of the Tobelo category 'fauna'. Rather than being problematic this seems to me to be a common feature of people's conceptual universes. We might ask if humans are 'animals' in British folk classification. The answer of course is that *it depends*, and in this respect Nuaulu beliefs are like those of many other peoples. Nuaulu recognise that animals have spirits, and that consequently killing or in some other way harming them presents many of the same problems as it would with humans. On the other hand, animals must be killed for food. In the latter circumstance, the contrasts between humans and animals are emphasised, while the affinities between human and animals are most likely to be uppermost in the context of suffering and misfortune [Karim, 1981: 4, 188].

There is, then, no commonly used or widely acknowledged Nuaulu term for all animals. **Ipai** is locally distributed and less than inclusive, while **makapana** reported by Rosemary Bolton is not otherwise known to me. Sometimes the AM term **binatan(g)** is used on an *ad hoc* basis to encompass or delineate a domain which appears to approximate to that which we call 'animals'. Consider, for example:

barani binatan mai inae ria muni, lit. 'those brave (or spirited) animals of the land'.

But if the terms are not consistently found, can we really infer a domain category?

Certain life-forms which are regarded as animals in phylogenetic terms have no obvious affinities with any putative Nuaulu category, and neither would we expect there to be. These include sponges (**unate nau moti**, '**unate** of the rocky littoral'), which are grouped with **unate**, 'fungi'. Molluscs and starfish, however, are firmly perceived as animals for a combination of behavioural and morphological reasons. Similarly, forms in core animal categories are clearly similar in multiple respects, and often overlap; the terms are often expressed as contrast sets, while animal partonyms ('head', 'heart', and so on) and other linguistic usages go some way to imply the existence of a category 'animal' [c.f. Taylor, 1990: 47–51]. Having said this it is important to note that since animal attribute terms are used so widely to refer to parts of plants and to inanimate and cultural artifacts, such evidence must be interpreted with care. On the other hand, the core of the domain is clearly regarded as being bound by polythetic affinities, such that the unique beginner is not as arbitrary as some [Hunn, 1977b: 44] have suggested, although its borders may occasionally be difficult to determine. There is no sharp division between animals and plants and other domains, in either linguistic or conceptual terms [Lévi-Strauss, 1966: 138–9; Morris, 1976: 542].

4.3 Hunting life-forms and other snarks

It has now become conventional to describe certain all-embracing categories within a particular domain of living things as 'life-forms'. For Berlin [Berlin, 1972; Berlin *et al.*, 1973; Berlin *et al.*, 1974; Berlin, 1976: 384–5], 'life-forms' are found at the level below unique beginner, are generally labelled with primary lexemes, are few in number and are polytypic, including most of those of lower rank. They are biologically large and heterogeneous, and psychologically definable in terms of a small number of characteristics. Terry Hays [Hays, 1983: 605–6] has recently said that the determination of life-form rank should have analytical priority, since this determines the modelling of the system. This, of course, indicates only too clearly that Hays is committed to an *a priori* top-to-bottom approach. Such an approach was the point of departure for Cecil Brown, who in a breathtaking number of papers published over a period of a few years, has developed hypotheses suggesting that life-form terms are added to languages in a regular sequence, after the manner suggested

by Berlin and Kay for colour terms [Berlin and Kay, 1969]. Most recently he [Brown, 1984a] has rejected Berlin's notion of rank in his definition of life-form, which allows him to consider forms which in Berlin's terms would technically be called 'generics'. However, in this case the use of the term 'life-form' becomes confusing, since it simply refers to any broad polytypic biological term. He has been criticized [Bulmer, 1985; Ellen, 1986; Hunn and French, 1984; Randall and Hunn, 1984] on the grounds that his hypotheses concerning the growth and development of life-form terms in languages are neither reliable nor detailed enough to prove or disprove anything, and that he has not provided definitions of life-form categories which are sufficiently clear to permit cross-language comparisons of these classes. Brown [1984b] has vigorously defended himself against similar charges, pointing out that his critics have failed to take account of shifts in his own published views, offering the usual statistical defence that 'the aggregate weight of the majority of cases' [p. 593) confirm his views and anyway says that the allegedly recalcitrant cases cited as evidence against his views do in fact fit. Others, also taking their point of departure from Berlin, have noted that for many peoples Berlin's criteria give rise to other life-forms not previously anticipated [Clark, 1981; Dwyer and Hyndman, 1984].

What I have to say here is clearly relevant to the debates summarised in the preceding paragraph, but it remains first and foremost an analysis of the Nuaulu data. In particular, I wish to address the problem of how we might begin to isolate Nuaulu life-forms, and only then go on to examine the degree to which my findings approximate to the views of Berlin, Brown and Hays. There are two ways in which we might do this. Firstly, we can summate all data on animal terms and classifying behaviour elicited in natural settings or through interviews and use this as the basis for any inferences we might care to draw. This has been the standard practice so far. Secondly, we can use a more formal and experimental elicitation technique, such as a card-sorting test. I examine both approaches here.

Within the all-encompassing semi-covert category 'animal', and without further sub-division, Nuaulu classificatory space can initially be partitioned into a near maximum of 83 basic labelled categories. These are set out in table 4.1. Given that reliable definitions of 'life-forms' are so difficult to establish, how can we distinguish which of these are life-forms and which are not?

We can perhaps begin by eliminating terms which also designate terminal

Table 4.1. *The partitioning of classificatory space between basic categories for the Nuaulu animal domain*

Non-basic categories	Basic categories	Gloss	No. of terminal categories
1	**marane**	cus-cus	4
2	**lau**	civets	1
3	**kuha**		1
4	**tui-tui**		1
5	**hahu**	pig	2
6 **peni**	**maianane**	deer	1
7	**asuwan**	cassowary	1
8	**asu**	dog	2
9	**mau**	cat	1
10	**une-une**	goat	1
11	**naitanane**	horse	1
12	**sapi**	cow	1
13	**korobou**	water-buffalo	1
14	**mnaha**	commensal mouse	1
15 **mnaha**	**imanona**	rats	2
16	**mirine**	unidentified murid	1
17 **manue**	**notane**	bats	8
18	**manue**	birds	56–57
19	**peku**	*Cuora amboinensis*	1
20	**enu**	marine turtles	2
21	**poso**	skinks (f), geckoes, agamids (i), some agamids, monitors and crocodiles (p)	4–18
22	**tekene**	most terrestrial snakes (f), sea-snakes, *Riopa, Tiliqua* (i), millipedes, centipedes, earthworms (p)	13–20
23	**notu**	frogs	7
24	**ikae**	fish and marine animals (f), marine coelenterates, echinoderms, squid, octopus, eels (p)	69<
25	**makasisi popole**	dragonflies and damselflies	4
26	**matamaine**	cockroaches	2
27	**kinahorake**	panesthids	1
28	**tananae**	termites	1
29	**uane utue**	winged ants	1
30	**kauke**	crickets, grasshoppers, mantids, bushcrickets, stick-insects and gryllids	14
31	**utu**	true lice wood-lice (p)	3< 1
32	**rikune**	various bugs, including stinkbugs	8–9
33	**makarota pina msahane**	cotton-stainers	1
34	**sisie**	cicadas	4
35	**nai**		1
36	**hana-hana**		1
37	**hite**	certain scarab beetles	2
38	**susine**	woodworm	1
39	**kapetite**	*Lanelalus insularis*	1

Table 4.1 (*cont.*)

Non-basic categories	Basic categories	Gloss	No. of terminal categories
40	**atori**	stag beetle	1
41	**sinne inae**	rhinoceros beetles	1
42	**kama-nahune**	long-horned beetles	2
43	**kinapopote**	light-producing beetles and fireflies	2–3
44	**kinoi**	anthibid beetles	2
45	**kinapukune**	sago palm weevil < other weevils	4
46	**kitoe**	unidentified beetle	1
47	**kinapari**	passalid beetles	1
48	**kinawerie**		3
49	**isanone**		2
50	**sohone**	ants	1
51	**muna usite**		1
52	**kumte**		1
53	**senete**		3
54	**inae, mui suane**	wasps and bees	1
55	**imanine**		3
56	**kori-korie**	butterflies (f), moths (p)	17
57	**kunte**	mosquito	2
58	**imanane**		1
59	**mumne**		1
60	**inapone**	true flies	1
61	**atinotoe**		1
62	**uri usue**	fly, earwig	1<
63	**sa sahune**	pond skater	1
64	**monote inae**	indet. insect	1
65	**nione inae**	coconut mite	1
66	**une-une**	caterpillars (homonymous with 10)	5<
67	**etine**	larvae, usually beetles and bugs	4<
68	**kusumun**		1
69	**nunu**	shellfish, barnacles	31
		nautilus (p)	1
70	**sonto**	squid	1
71	**urita**	octopus	1
72	**mitane**	prawns, shrimps (f), lobsters (p)	8–10
73	**katanopune**	crabs	15
74	**kahunekete**	spiders (f), harvestmen (p)	10–12
75	**kanopone**	scorpions	1
76	**'WORMS'**	nematodes, flatworms, seaworms and earthworms	7
77	**niniane**	centipedes	2
78	**nikenuke**	millipedes	3
79	**tinene**	sea urchins	2
80	**mimi**	king crab	1
81	**une nuae**	starfish	4
82	**taripan**	sea cucumber	1
83	**nuae huae**	jellyfish	1

Key: f = focal; *i* = intermediate; *p* = peripheral.

categories and which are not unambiguously aggregated further (e.g. **taripan**, 'sea cucumber'). This drastic measure reduces the total of potential candidates to a near-manageable 39. If we extend the same criterion, namely polytypy of basic categories, so that we eliminate those containing five or fewer terminal categories, we get just 15. What we must infer from this, therefore, is that 88 per cent of Nuaulu basic categories, though only 28 per cent of terminal categories, are not classified into more inclusive groups within the domain. In Berlin's terms, this leaves an awful lot of empty classificatory space which ill suits his taxonomic model. The remaining categories are (with their focal gloss to the right):

notane	bats
manue	birds
poso	skinks and other lizards
tekene	snakes and allied forms
notu	frogs
ikae	fish and related forms
kauke	crickets and related forms
rikune	bugs (though not exhaustively)
kori-korie	butterflies and moths
une-une	caterpillars
etine	grubs
nunu	shellfish, barnacles and slugs
mitane	prawns and lobsters
katanopune	crabs
kahunekete	spiders and harvestmen

We might wish to exclude 'caterpillars' and 'grubs' on the grounds that their membership merges and is uncertainly extendible, though more importantly perhaps because they are developmental stages. Although I argue elsewhere that this does not prevent them being used contrastively after the manner of all natural kinds (chapter 2.8), they are a disputable case and I eliminate them here to simplify the rest of the argument.

This list provides us, then, with a reasonable baseline, but we should also note that certain basic categories are further aggregated. In table 4.1 the second column indicates superordinate groupings of basic categories. Three of these are named: **peni** (loosely, 'big game'), inclusive **mnaha** (murids), and inclusive **manue** (birds and bats). These are non-basic in the sense that, with the possible exception of **mnaha**, they cannot be reduced to a single cognitive prototype, are less categorically salient, and are rarely used to identify or to refer to an animal *in the first instance*. They

are optionally 'primary' as both terms and categories, in the sense outlined in the previous chapter, in that for some people at least they represent the most inclusive means of grouping animals within the domain. If we consider these to be contrastable with other labelled categories which cannot be aggregated further within the domain, we increase the number of potential life-forms to 13 by adding **mnaha** and **peni**, but must also consider the possibility of merging **notane** with **manue** to form SUPER-**manue**.

What complicates matters even further is the possibility that additional basic categories may be grouped together into more inclusive categories, but without consistent terminological expression. There is good evidence to suggest that 20 basic categories are aggregated in this way to form six superordinate unlabelled categories. Thus, in table **4**.1 there are four superordinate covert categories for insects which can be isolated using criteria discussed in section **4**.6. They correspond in most general terms to the following phylogenetic groupings: *Cicadidae* (cicada), *Formicidae–Myrmicidae* (ants), *Vespidae–Sphecidae–Apoidea* (bees and wasps) and DIPTERA (most two-winged flies). Additionally, there is one category which aggregates actual and putative civet cats, another which aggregates all turtles and another (rather residual) group of WORMS. If these covert categories are to be regarded as 'primary', in the sense that they are of equal cognitive salience to other named primary categories which cannot be regularly grouped in any other way within the domain, then the total number is increased to 20.

The second means I have adopted to get at the more inclusive categories adopted by the Nuaulu when dealing with animals has been card-sorting tests. I have discussed the conduct of these tests, together with my reservations concerning them, in chapter 1. In chapter 5 I present some matrix data as it relates to specific selected animal groups. Table **4**.2 below presents the master matrix from which these sub-sets are drawn; while table **4**.3 lists the names of all respondents (some working in pairs), and also some numerical data on the character of respondents' performance.

On the basis of the data presented in table **4**.3 certain conclusions may be drawn:

1. Respondents were remarkably consistent in the total number of groups that they created. This is illustrated graphically in figure **4**.1, for all animals found in the Nuaulu area that featured in the test. This cannot be accounted for in terms of the space available for performing the test, but might have been slightly influenced by the restrictions placed on the number of piles comfortably placed within arm's reach.

Table 4.2. *Results of a card-sorting test conducted in 1975. Numbers in row 1 and column 1 refer to picture-cards, the identities of which are listed beneath the matrix. Where 10 or more of the group of 27 respondents agreed on a pairing (e.g. fish in same pile as freshwater prawn) the matrix has been boxed in.*

	07	08	84	50	37	09	05	83	12	85	10	68	62	79	73	74	56	76	66	61	86	60	49	01	43	75	70	71	59	02	14	11	72	55	06	13	78	03	77	65	04	51
07	00	26	01	02	01		01	01	01	01					01	01	01	02			01																					
08	26	00	03	02	01		01	01	01	01					01	01	02	03	01		01																					
84	01	02	00	23	09	03	04	04	04	02					07	05	05	18	02																							
50	02	03	23	00	12	01	03	02	02	01					07	05	07	18	02																							
37	01	01	09	12	00	09	03	17	14	10					04	04	02	09																							
09			03	01	10	00	09	16	21	23	03	02	02	01				01			01																				02
05	01	01	04	03	03	08	00	05	05	08	01	01	01	04	03	03		03		02	05	03	06	01	01																01
83	01	01	04	02	17	16	05	00	23	16				01	01	01	01	02			01		01																		01
12	01	01	04	02	14	21	07	23	00	19				01	01	01	01	02			01		01																		02
85	01	01	02	01	10	23	06	16	19	00	03	02	02	01				01			01		01																		01
10						04	01			03	00	25	24																												01
68						02	01			02	25	00	26																												
62						02	01			02	24	26	00																												
79						01	04	01	01	01				00		01	02		01	04	02	03	02	01	02																01	
73	01	01	04	07	04		03	01	01						00	25	10	09	02																						
74	01	01	05	05	04		03	01	01					01	25	00	11	07	02																						
56	01	02	06	06	02			01	01					02	10	11	00	11	03																						
76	02	03	18	18	09	01	03	02	02	01					09	07	11	00	02																						
66		01	02	02										01	02	02	03	02	00	01																						

	07	08	84	50	37	09	05	83	12	85	10	68	62	79	73	74	56	76	66	61	86	60	49	01	43	75	70	71	59	02	14	11	72	55	06	13	78	03	77	65	04	51
61							02							04					02	00	05	25	05	20	23	02	03	02	01	03														
86	01	01				01	05	01	01	01				02						05	00	06	25	04	04		01	01		01													
60							03							03						25	05	00	05	21	24	02	03	02	01	02													
49						01	06	01	01	01				02						05	25	05	00	03	05	01	02	02	01	02													
01							01							01						20	04	21	03	00	21	02	04	03	02	04										02			
43							01							02					01	23	04	24	05	21	00	03	04	03	02	04													
75																				02		02	01	02	03	00	23	18	20	20						01	01	01	01		01		
70																				03	01	03	02	04	04	23	00	18	16	23													
71																				02	01	02	02	03	03	18	18	00	22	17													
59																				01		01	01	02	02	20	16	22	00	14	01		01	01	01	01			01	01	01		
02																				03	01	02	02	04	04	20	23	17	14	00													
14																													01		00	23	19	19	23	03	04	01	04	21	05	02
11																													01		23	00	17	17	24	03	04	02	04	18	05	01
72																													01		19	17	00	25	20	02		02	01	23	03	01
55																													01		19	17	25	00	18	03		01	01	23		
06																													01		23	24	20	18	00	04	03	02	03	20	03	
13																										01			01		03	03	03	02	04	00	22	04	23	02	10	09
78																										01					04	04	01		03	22	00	06	24		12	10
03																										01					01	02		01	02	04	05	00	03		06	02
77																								02		01			01		04	04	01	01	03	23	24	03	00	01	12	09
65																													01		21	18	23	23	20	02		01	03	00	01	
04														01												01			01		05	05	03		03	10	12	06	12	01	00	17
51						02	01	01	02	01	01																				02	01	01			09	10	02	09		17	00

Key: Numbers refer to a sequence of 81 cards, not all of which were used in this test (see chapter 1.6): 01 butterfly; 02 bat; 03 Malay civet, *Viverra tangalunga*; 04 rat; 05 agamid lizard, *Calotes cristatellus*; 06 dog; 07 ranid frog; 08 tree frog; 09 house gecko; 10 reticulate python; 11 wild pig; 12 monitor lizard; 13 domestic cat; 14 deer; 37 crocodile; 43 moth; 49 mantid; 50 leatherback turtle; 51 cuscus; 55 cow; 56 crab; 59 cassowary; 60 cicada; 61 dragonfly; 62 centipede; 65 goat; 66 land snail; 68 earthworm; 70 gull; 71 pigeon; 72 horse; 73 lobster; 74 freshwater prawn; 75 hornbill; 76 fish; 77 plantain squirrel; 78 palm civet, *Paradoxurus hermaphroditus*; 79 spider; 83 agamid lizard, *Hydrosaurus amboinensis*; 84 freshwater turtle; 85 skink; 86 bush cricket.

Table 4.3. *Summary data on group numbers and sizes for 27 male respondents in card-sorting test*

	Informant name	Total no. of groups	No. of groups of 1 item	No. of groups of 2 items	No. of groups of more than 2 items	No. of items in largest group
1	Heunaka, Naunepi	11	1	4	4	8
2	Komisi Somori	7–10?	1	1	3–5?	7–8?
3	Naupate Matoke	16	3	5	3	7
4	Waka	16	3	4	3	6
5	Napwai Somori	15	3	6	4	6
6	Wasale	15	4	3	4	8
7	Soiile Sonawe	21	3	12	1	4
8	Patona Sonawe	17	7	4	4	7
9	Iako-Hitinisi	11	1	4	4	10
10	Teliam Matoke	9	2	1	5	11
11	Sauute Nepane	12	2	2	5	6
12	Lohia Sonawe	10	0	2	6	7
13	Nepinama	9	3	2	3	6
14	Retau'une	14	0?	3+	2+	5?
15	Retanusa	13	2	4	5	6
16	Pela-uma	13	3	4	5	6
17	Wata	14	3	4	5	6
18	Saite Somori	14	4	4	3	10
19	Sahiane	14	2	5	4	6
20	Latulesi Matoke	14	3	1	6	6
21	Hotena Nepane	12	1	4	3	6
22	Naunepe	14	1	1	5	6
23	Saniau	11	3	0	6	6
24	Sorita Matoke	12	2	3	5	6
25	Kaikunana	19	6	7	3	5
26	Patikore	12	3	2	4	10
27	Panakeke	15	3	5	3	7

2. All respondents had groups composed of single items, although these never constituted more than 50 per cent of the total number of groups sorted. Also, groups were always numerically small, and there was little agreement on what kinds of animals bore least resemblance to all the others.

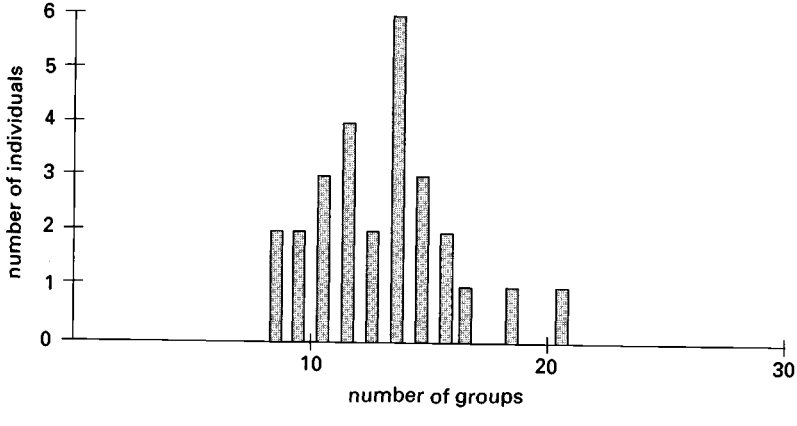
3. All respondents had groups containing only 2 items. There was a strong tendency to pair certain animals, suggesting that this reflected a widespread tendency in classification. Commonly recurring pairs were: **notu – poro-poro** and **peku – enu**. It is likely that findings 2 and 3 were affected by the kinds of animals depicted on the cards. Had additional animals been included, it is possible that the number of singles and couples would have been fewer; and if fewer animals had been available then it is possible that the number would have been greater.

4. No group exceeded 11 cards, and the average size of the largest group was 6.8 (SD = 1.69, v = 0.25), astonishingly close to the optimal seven long ago predicted by Miller [Miller, 1956] for effective cognitive management.

If we now turn to table 4.2, it can be seen that there is a considerable amount of agreement on the main inclusive groupings. For this purpose I have regarded as significant clusters where 10 or more respondents have agreed on a pairing. These groups (bracketed in the table) are BUTTERFLY–MOTH, BUTTERFLY–MOTH–DRAGONFLY and DRAGONFLY–CICADA; CRUSTACEA, MANTID–CRICKET, BIRD–BAT, CROCODILE–TURTLE, FISH–TURTLE (and FISH–CRUSTACEA), SNAKE–WORM, LIZARD (and LIZARD–CROCODILE), TURTLE, FROG, focal LTQ (large terrestrial quadrupeds) and some small overlapping groups which suggest some recognition of the resemblances between small furry creatures. We can say the following about these patterns:

1. BUTTERFLY–MOTH, MANTID–CRICKET, BIRD–BAT, SNAKE–WORM, LIZARD and FROG can be labelled by **kori-kori**, **kauke**, **manue**, **tekene**, **poso** and **notu** respectively, in each case in their broadest extension. They are therefore equivalent to the same life-form terms elicited through indirect methods, which to this extent corroborate each other.

Figure 4.1 Relationship between number of individuals in card-sorting test and number of groups elicited



2. The FISH–CRUSTACEA, CROCODILE–TURTLE and FISH–TURTLE groupings appear to indicate a strong presumption among respondents that an aquatic lifestyle should be encoded in the classification. I suspect that had more cards been available featuring different kinds of fish, this tendency would not have been so marked. It shows the danger of adopting the procedure [as used by Perchonock and Werner, 1969], whereby names are requested for piles of cards. There need be no clear relationship between the normally accepted reference of terms and the groups into which respondents sort cards.

3. What I call here CRUSTACEA is in fact CRAB–PRAWN–LOBSTER. It may indicate a strong tendency to recognise crustacea collectively, though were more options available to respondents it might have proved to be a covert grouping for all small water creatures other than FISH (narrowly defined).

4. CICADA–DRAGONFLY and BUTTERFLY–MOTH–DRAGONFLY suggest a tendency to group small flying creatures which are obviously not BAT–BIRD.

5. There is clear evidence for an incipient LTQ category, and for a grouping of 'small mammals', although the table indicates some internal disagreement as to the composition of this latter group. It may well be that we have here an example of the kind of process by which more inclusive categories develop through binary opposition of dimensionally salient sub-categories [Brown, 1979]. However, it is not clearly designated terminologically. Occasionally, juxtaposed uninomials may be employed in a rather *ad hoc* way to indicate connections between animals within this general space. Thus **hahu–maianane** is common; **hahu–maianane–marane** is rare, but is sometimes used in the specialised context of hunting. Lists may also substitute for single terms. The term **peni** is rigorously limited to cassowary, pig and deer, and is considered in greater detail at 4.3.

Although tests of the kind employed indisputably encourage the elicitation of categories based on monothetic criteria, the evidence of table 4.2 suggests that respondents were employing both prototypes (MANTID–CRICKET, BUTTERFLY–MOTH, FROG, TURTLE, LIZARD), and restricted criteria such as water-living (FISH–CRUSTACEA, FISH–TURTLE), water-living but notably excluding fish, perhaps amphibious (CROCODILE–TURTLE), and flying vertebrates (BIRD–BAT). The structure of focal LTQ is unclear and complex, and is perhaps a prototype plus some restricted criteria.

4.4 Criteria of allocation

What is striking about the results of the test discussed above is that, in seven out of the 15 macro-categories, encoding is based significantly on habitat or behaviour rather than physical form. This is not what we might expect from the bulk of the literature, which has invested much in the existence of a universal scheme based on morphological features. What is seldom made clear, however, is the extent to which the classifications so yielded arise from the application of neutral stimuli, and the extent to which they reflect prior assumptions on the part of the ethnographer. Much has been made of what is now undeniably established, that 'all natural languages give recognition to naturally-occurring groups' [Raven *et al.*, 1971: 1210). It is said that every known people has such a classification, although some have grudgingly admitted, on the strength of the evidence, that even here non-morphological features may occasionally protrude in determinant ways [Hays, 1983: 599]. While it is true that the data easily yield such classifications, we should not confuse those 'keys' used after the event to justify a pattern – or a rule of thumb used in any particular instance – with classifications which are a more permanent and shared feature of cultural representations [Taylor, 1990: 44–6]. I do not doubt that such exist, but how do we distinguish them? We can distinguish keys clearly from classifications in science, but not in folk science. The fact that people are asked questions about habitat, behaviour and the time that an animal was found only reveals elicitation procedures and implies some process of 'keying out' [Taylor, 1990: 45], but if the end result is a non-morphological category rather than a morphological one, why should we simply reduce it to a 'key'? Hays [1983: 594] will have none of this and objects to what he sees as the confounding of separate functional and morphological classificatory 'systems'. But this is an article of faith, since he has determined in advance the criteria to be considered. We are certainly not dealing with different 'systems'. How can the Nuaulu classification of animals on the merits of their food value be regarded as a 'system'? No, they are artifacts of a single *system*, but not of any one classificatory arrangement. The reason why some are compelled to link 'general purpose' classifications with morphology is not because morphological classifications have some inherent quality which make them more appropriate, but because morphological classifications are more amenable to cross-cultural analysis and universalist generalisations.

Wierzbicka [Wierzbicka, 1984] distinguishes taxonomic supercategories from others by the fact that they have a semantic common denominator.

Thus 'bird' may be rendered taxonomically since all birds have common distinctive features and one can draw a generalised bird. 'Toys' on the other hand do not: their similarity is simply functional; similarly 'vegetables' do not stand for a kind of thing. However, animals do not have to be drawable to have common distinctive features. This is a fallacy of cultures where graphic representation has been reified, since it determines how all things should be represented. It also confuses the means of yielding categories with the characteristics of semantic domains. Behavioural, no less than physical, qualities may serve. But beyond this, Wierzbicka assumes that functional and taxonomic categories are distinguished in 'primitive' classifications. Hence, when ethnographers look at classifications they are predisposed to 'see' several systems in operation, of which one – the morphological – has some kind of cognitive primacy. It would not be too perverse – I think – to claim that a rigorous morphological classification might be viewed as a 'special purpose' adaptation to a cultural context in which the usual utilitarian factors are rigorously excluded, and is therefore logically secondary. Hunn [Hunn, 1975b: 312], following Berlin, makes the point (that of the professional zoologist) that scientific classification is 'general purpose', but in a sense morphological classifications are highly specialised. The Nuaulu have no particular requirement for an exclusively morphological classification, either logically, cognitively or pragmatically. While I am perfectly prepared to accept that some societies operate with a clearly separate system based on morphological characteristics, in others the situation is more complex. Moreover, I would hypothesise that a general-purpose system based predominantly on morphological characteristics, like the predominance of 'life-form' terms, is more apparent as societies become increasingly complex and less semantically attached to the natural world.

In my experience of talking to Nuaulu hunters and collectors, and in analysing endless transcriptions of conversations during the course of which animal specimens were identified and discussed, I find it impossible to conclude that natural objects are classified exclusively according to morphological criteria, or that a classification based wholly (or even substantially) on morphological criteria has any basis in the conceptual distinctions that the Nuaulu themselves make. There is nothing in Nuaulu practice or belief which would permit inferences which would exclude non-morphological criteria or relegate them to a secondary position. I can think of no good reason why I should eliminate non-morphological criteria from any integrated analysis of Nuaulu animal classification, and certainly no reason why I should include some and avoid others. In the

absence of an all-pervading standard, some individuals are personally inclined to favour habitat, others shape, and so on [c.f. Bulmer *et al.*, 1975: 273]. Locational, behavioural and cultural factors of different kinds are mixed freely with those derived from physical appearance. No distinctions are made between morphological and non-morphological classifications, only between different classifications for different purposes. This is the picture that emerges using non-directive techniques. If you rely entirely on the direct-question-frame approaches (using pictures, slip-sorting tests and so on) you will inevitably tend to extract classifications in which (among other things) physical appearance is prominent.

Let me put it another way. I have been tempted in the past to undertake an analysis of Nuaulu symbols which would suggest what Needham calls a 'total concordance' between different symbolic domains [Ellen, 1980]. You can do this by using standard structuralist logic of identifying binary oppositions and patterns of linked symbolic analogies. I have resisted this because I believe it would violate the conceptual regularities which the Nuaulu themselves experience. In other words, regularities would be generated which accord with what the analyst wishes to find and (at this level of analysis) there is just no way that the propositions are testable. Likewise, I may extract a classification of Nuaulu animals based entirely on morphology but I would not be prepared to say that this was 'the Nuaulu classification of animals' or that it could tell us how Nuaulu regularly conceptualise the animal world and classify in their day-to-day experience.

Many reports on animal classification have routinely featured the incorporation of non-morphological features at an inclusive level, and however much we may question individual research strategies we must at least give credence to the evidence. Thus Perchonock and Werner [Perchonock and Werner, 1969: 231] report that Navaho use categories such as 'landdwellers', 'walkers', 'crawlers', 'day animals', 'night animals' and 'dangerous animals. [see also Taylor, 1980: 174]. Groote Eylandt aboriginals employ 'animals of the sea', 'winged creatures and others', and 'animals of the land' [Waddy, 1982: 72], apparently contrastively; while Paiute place much emphasis on utility [Fowler and Leland, 1967]. Here, morphological criteria may function more as 'keys' than as 'fixed classifications', but the borderline is in such cases fine, and we cannot determine this *a priori*.

The range of criteria evident in Nuaulu animal-classifying behaviour is set out in table 4.4 [c.f. Brown, 1981: 4]. We would of course not expect such criteria to be evidence of how regularities are encoded at a

Table 4.4. *Non-morphological criteria and related coded contrasts evident from Nuaulu animal classification*

	Criterion	Coded contrasts
1	habitat	air–arboreal–ground, ground–subterranean, sea–land, village–forest, house–forest, garden–forest
2	proximity	near–far, house–village–forest–mountains, Nuaulu area–outside Nuaulu area
3	edibility	prohibited–available, poisonous–non-poisonous, clean–dirty
4	dangerousness	dangerous–harmless
5	domesticity	domestic–wild, interacts with humans–does not interact with humans
6	symbolic status	sacred–mundane–profane
7	locomotion	flier–crawler–burrower–climber–walker–swimmer
8	feeding habits	meat eater–plant eater, eater of clean food–eater of dirty food
9	occurrence	rare–common
10	temporal distribution	nocturnal–diurnal, migrant–permanent resident

cross-cultural level since environments are so variable. It is instructive to look at a few of these in a bit more detail.

1–2. Bulmer [Bulmer *et al.*, 1975: 2–3, 11–13] first emphasised the underlying importance of habitat, proximity and physical zonation in animal classification. In Nuaulu animal classification 'forest:village', 'house:garden', 'house:non-house', 'leaves:branches', 'sea water:freshwater', 'in the ground:on the ground:in the trees' are all common contrasts below the basic naming level, and are reflected in terminologies. At an intermediate degree of inclusiveness we can infer similar contrasts, in, for example, the distinction between **poso** (garden, village periphery) and **imasasae** (house/village). There is also a threefold distinction between house/village–gardens–forest. The arboreality of animals may be highly significant, and comes out strongly in grouping tendencies revealed by informants for terrestrial mammals. Although **manu** and **ikae** may be over extended on the basis of the habitat criterion, dwellers of the 'sky' and 'water' respectively, there is no comparable term for land animals, although various contrasting uses suggest such a category. Being a terrestrial species itself, it would seem that *Homo sapiens* is inclined to take land habitats for granted, initially marking at the widest degree of inclusiveness those habitats which constitute some kind of environmental 'other'.

It is important to note that the criterial continua used in classifying animals often overlap. Thus a classification based on habitat may also

encode proximity, and a variety of cultural values. Which are emphasised depends on the context. Moreover, this may happen in surprisingly irregular ways. On one occasion animals of the house were contrasted with those of the ground, it being important to remember in this context that traditional Nuaulu houses are raised on piles. Mice, geckos, cockroaches and spiders are expected in the house (even centipedes, which are dangerous); while skinks, terrapins, death adders and other snakes are not. Snakes, of course, occasionally come into houses and this is regarded as 'matter out of place'. If it happens persistently, then some explanation is sought.

3. The Nuaulu all share a simple classification of food: **panesi muaina**, 'solid foods' as opposed to 'liquids', **ininiu**. Only two unambiguous super-categories are used: **utane**, to refer to all green vegetables, e.g. **kasipi totue**, 'manioc leaves', and **haun huae**, used for spices and relishes such as chilli and peppercorns. The term **piae** is used for processed but uncooked sago flour. All other terms for food are simultaneously the names of kinds of plants and animals. In my view this includes the possibly controversial category **peni**, which in food contexts refers collectively to the flesh of cassowary, pig and deer, and about which I shall have more to say shortly. AM food categories are occasionally employed which have no direct equivalent in Nuaulu. Thus, in the absence of any Nuaulu word for 'meat', the Malay word 'daging' may sometimes be heard, which has a wider semantic range than **peni**. However, the effective lexicon for food is minimal, incipient and no more than a special-purpose gloss on animal and plant terms with which it heavily overlaps. I do not find it helpful to distinguish it as such here. Not all animal and plant categories constitute food, and some are much more important than others.

4. Dangerousness (fear, 'send shivers down your spine') overlaps with edibility, and is again important in the classification of snakes. But the fact that animals may be afraid of humans was also thought to be a consideration. Among these are turtles and crabs, which 'run away when they see humans'.

6. Animals that are totems obviously become salient and therefore focal categories in classifications. The obvious instance of this in Nuaulu ethnography is with respect to birds. Thus, I have at least one example of mythic association resulting in pairing cassowary and hornbill. I have elsewhere [Ellen, 1975a] reported on the myth which links these two, and the cassowary is generally regarded as anomalous. It is therefore not

entirely surprising that these two highly salient categories, conjoined in myth, one of which is regularly considered a member of a category (**peni**) contrasted with **manua** ('birds'), should occasionally be put into a separate group different from both 'birds' and **peni**.

7. Behaviour and mode of locomotion are important criteria in arriving at the more inclusive categories: thus swimming is central to the definition of **ikae**, flying to **manu** and slithering to **tekene**. It does, though, give rise to problems of allocation for some groups, such as frogs (which are amphibious) and bats and many insects (which fly but do not share many of the focal attributes of **manua**). Thus, if under pressure to allocate to general categories, informants might begin by designating over-extended categories based on single attributes, such as 'flying', and qualify by creating a focal and residual category. Informants who began by including bats in **manua**, might then divide the group into true **manua** and bats. Similarly, **manua** may be sub-divided into birds which fly (**manua roe ai atu**), and those which do not. Intuitively, I would claim that 'true' **manua** are focal **manua**.

8. Feeding patterns of animals were also sometimes used at various degrees of inclusiveness. Thus, one respondent in the card test did not place **mau** (cat) and **imanona** (rat) in the same category on the grounds that one predated upon the other. Another informant insisted (though not in the test) on grouping together **hahu** (pig), **asuwan** (cassowary) and **sapi** (cow) on the grounds that they were all grass-eaters, which is anyway not strictly true. In the test, the strong association of goats, cows, deer and horses is certainly on the grounds of their being graminivorous ungulates. On other occasions, the fact that pigs eat fruits and dogs eat faeces was mentioned as being diagnostic.

There are a number of other non-morphological criteria of lesser importance which some informants used and justified in classifying animals, both in formal tests and elsewhere. Call is a significant component of identification and classification among frogs and birds, smell is an occasionally relevant consideration (e.g. stink bugs, civet), as may be the stamina and strength of animals. Thus, one informant paired **nusi** (large birds of the coast and sea) and **asuwan** on the grounds that they were able to travel long distances. Another contrasted these same two on the grounds of their strength, in contrast to the weak **sopite** (hornbill). The characteristic of 'poisonousness' clearly enters into Nuaulu classification of snakes.

The category **peni** deserves special mention in this context since it raises many of the problems of a rigorous distinction between morphological and non-morphological classifications, and between special and general-purpose ones. It is confined to pig, deer and cassowary, and is defined in terms of multiple criteria. The inclusion of cassowary gives rise to an anomaly arising from the apparent dual membership of cassowary with birds. The category is distinguished on ritual, morphological, behavioural, economic and linguistic grounds [Ellen, 1975a].

1 **Peni** animals are subject to prescribed modes of distribution which involve an offering to the ancestral clan spirits each time an animal is killed. The jawbones of deer and pig (**penesite**) and the breastbone of the cassowary are preserved, are the focus of ritual attention and are eventually strung across the roof space of each clan section house (**numa monne**).
2 **Peni** animals are also distinguished according to their size, representing as they do the three largest indigenous terrestrial animals on Seram. There are also behavioural similarities.
3 They are also of greatest importance economically and are subject to comparable hunting practices. In this respect **peni** is similar to Kalam 'kmn', for game animals [Bulmer, 1968].
4 Although the categories **asuwan**, **hahu** and **maianane** are commonly – perhaps most frequently – referred to by their uninomials, in some contexts of uncertainty or emphasis a binomial may be used e.g. **peni asuwan**, **peni hahu**, **peni maianane**. Similarly, in terms of Nuaulu expression of classificatory status with reference to categories as members of more inclusive groupings, it is as appropriate when **peni** is the category concerned as it is for any other. Thus, **asuwan** may be spoken of as **asuwan nai peni**, 'cassowary of the natural kind **peni**', in the same formulaic way as, say, **nai manue** or **nai tekene** might be used.

It seems to me that the dimensions of similarity and contrast are too complex for us simply to say that we are dealing here with an incipient special purpose 'meat' category, or that we are dealing with incipient MAMMAL/'meat' polysemy [Brown, 1979].[4] Quite apart from anything else, **peni** excludes much meat that the Nuaulu routinely consume (bat, phalanger, civet – to list only the mammals), while we have already seen that AM 'daging' may sometimes be used in a more obvious sense as a generic meat category, with none of the symbolic and classificatory overtones of **peni**. It is of course possible that such a term might evolve into a fully-fledged meat category given the right conditions, but in

contemporary Nuaulu culture **peni** remains comparable to other animal categories.

4.5 Do life-forms exist?

When we come to compare the findings obtained from the test and those obtained through non-directive methods (table 4.5), it is clear that there are five unambiguous life-form equivalents: **kori-kori** (BUTTERFLY–MOTH), **kauke** (MANTID–CRICKET), **manue** (BIRD), **poso** (LIZARD) and **notu** (FROG), where each is employed in its most extended sense. Additionally, although the content is not quite identical, **tekene** (SNAKE) and **ikae** (FISH) are sufficiently close to suggest that these have a higher salience than other potential life-forms.

The test seems to have done two things: it has tended to over-aggregate and has come up with a far smaller number of potential life-forms. This seems to be because the number of animal types used in the test was limited compared with average Nuaulu personal experience, and was skewed to give as wide a *phylogenetic* coverage as possible. Had there been more cards for different kinds of, say, spider, then we might reasonably have expected spider to register as a possible life-form. Much the same might be said for covert categories, where the only equivalence is TURTLE.

These are all terms that the Nuaulu regularly use in a way which suggests that they are given high salience, are contrastable, are of the same order and which also correspond to some formal requirements of a life-form definition. In other respects these categories are different from each other.

What is, I think, clear is that there is a gradation of inclusive categories, some highly salient culturally and widely shared, others – decreasingly – less so. It is difficult to isolate a set of Nuaulu life-forms. The features used by Berlin are imprecise (how polytypic, how heterogeneous?), sometimes tautologous ('few in number') or demonstrably limiting (definable in terms of a small number of features). Since Brown has now rejected Berlin's notion of rank, and as I also reject it, there seems to me no useful reason why we should retain the term 'life-form' in its technical sense, since 'primary term' and 'primary category' adequately describe as much as Brown and myself wish to convey. We can talk about the encoding sequence of animal terms in language without referring to 'life-forms'.

At the widest possible degree of inclusiveness in animal classification it is clear that categories are established on the basis of both gross morphological and behavioural cognitive prototypes. However, some have

Table 4.5. *Comparison of possible Nuaulu life-forms elicited through non-directive and card-sorting methods*

	Elicited non-directively	Registered in card-sorting test
A	*Labelled categories*	
1	SUPER-BIRD	SUPER-BIRD
2	SUPER-LIZARD	SUPER-LIZARD
3	SNAKE–WORM	SNAKE–WORM
4	FROG	FROG
5	MANTID–CRICKET	MANTID–CRICKET
6	BUTTERFLY–MOTH	BUTTERFLY–MOTH
7	FISH	
8	SUPER-PRAWN	CRUSTACEA–FISH, CRAB–FISH, CRUSTACEA
9	CRAB	CRAB–FISH
10	SHELLFISH	
11	QUASI-BUG	
12	**PENI**	
13	(PHALANGER)	
14	(MURID)	
B	*Covert categories*	
15		LARGE TERRESTRIAL QUADRUPED
16	TURTLE	TURTLE, CROCODILE–TURTLE
17	CIVET	tendency to group small mammals in various different ways
18	CICADA	
19	ANTS	
20	BEE–WASP	
21	DIPTERA	
22	WORM	
23		various cross-cutting insect combinations e.g. dragonfly–cicada, butterfly–moth–dragonfly,

Note: Parentheses indicate marginal or doubtful cases.

wished to define life-forms in terms of a few features, or on the basis of a gross morphological gestalt. Such variance should not surprise us since this is that aspect of classification systems which is most prone to ideological invasion and to 'special purpose' categories. We also find that, in practice, prototypical and monothetic criteria may be employed to define the same categories. Thus FISH is focally defined as 'a creature possessing fins, gills, and a streamlined body, adapted to an aquatic environment' [Brown, 1979: 793], but may sometimes be extended to other aquatic animals lacking some or all of these features [Hunn, 1977b: 250]. This focal core–periphery (prototypical–monothetic) pattern is common [Hunn, 1982: 11], and occurs in the Nuaulu case with respect to **ikae**, **tekene** and **manue**: FISH, SNAKE and BIRD respectively. The remaining primary categories in the list are ones based on prototypes, as are **notu**,

poso and TURTLES; and **mnaha** and **marane**, if these be accepted. Only WORMS is based upon a rigorously monothetic definition, which does not reflect natural resemblances other than size proportions and overall minimalness. It is both incipient and residual, to use Brown's [Brown and Chase, 1981] terms. **Peni** is based on a prototype, but resists acceptance as a primary category since it appears also to be a special-purpose proto-'meat' category, a view which I have here challenged. Thus we must expect to find terms at this level reflecting logically inconsistent kinds of concept, some being biologically natural, others arbitrary, residual and monothetic [Hunn and French, 1984: 837–9]. And the ratio of these will vary from one culture to another. But just because certain 'life-form' categories are found widely cross-culturally does not mean that we should accord them greater salience in particular folk classifications – other categories may be more culturally significant. For the analyst, terms of the kind Brown and Berlin see as life-forms are salient because they are those more likely to be incorporated into dictionaries and written lexicons, because they are terms most commonly in use, and which occur most frequently in ordinary speech correlated strongly with the order in which they are added to languages [Brown, 1981: 14–5].

Finally, Brown [Brown and Chase, 1981] reports the widespread occurrence of an incipient life-form term which is used only when more specific terms are unknown. A certain amount of caution is required here since many of the more inclusive Nuaulu labels are regularly used in this residual way:

eeeee ... manu rei, manu mani, 'eeee ... that bird, that's just a bird'.

It is a different matter to use a term exclusively for generically related forms the more specific terms for which are unknown. Thus, if the Nuaulu know that a bird is a **nakatua**, they will not call it **manua** even though they know perfectly well that **nakatua** is a type of bird. Therefore we have to be sure that the more general term is quite specifically excluded. Using this criterion, no Nuaulu macro-categories anywhere approach the examples cited by Brown and Chase, although some share certain features in common. Thus **poso** is only used to refer to more specific forms of lizard within the life-form category which it also designates, either when they are unknown or when they are specifically known as **poso**. Thus, it is quite acceptable for one informant to say of a lizard 'that is a **poso**', and for another to say 'that is not a **poso**, it is an **imasasae**', and for another to say 'that is not a **poso**, it is a **poro-poro**'. I have many instances of this usage on tape, and it clearly indicates that the terms are

being used polysemously at different degrees of inclusiveness (chapter 3.9).

4.6 Intermediate categories

Between the most inclusive Nuaulu animal categories and basic naming categories, there is a zone of classificatory space characterised by: (a) some very clearly defined intermediate categories; (b) a large number of covert or pseudo-covert categories; (c) considerable variation between informants and overlap between categories; and (d) the use of the same term (or terms containing common prefixes) to refer to categories at varying degrees of inclusiveness (see table 3.5). Conklin [Conklin, 1954: 97] speaks of 'mid-groupings', but not as an identifiably structured terminological series. Berlin says that intermediate-level categories are rare, but it is now clear that they exist in many societies [Hage and Miller, 1976], and may be employed in important and subtle ways.

In the Nuaulu case labelled intermediate terms are found among bats, lizards, frogs, shellfish, possibly snakes, but most notably among birds (appendix 3), where they come close to resembling family-level botanical grouping in their shared salience [Atran, 1981]. However, they do not act as good taxonomic categories, being neither mutually exclusive nor resulting in an unequivocal and exhaustive partitioning of more inclusive categories. But just because they are untaxonomic there is absolutely no reason for not regarding them as an intrinsic component of a single system of animal classification. They may be clearly named and autonomous, e.g. **nusi** (referring to gulls, terns, PELECANIFORMES); may be expressed through a process of category extension from a focal type, distinguished by a single criterion (e.g. 'flightless birds'), or any combination of these. Some may be entirely covert [cf. Bulmer, 1979: 62], e.g. 'hawks', while others are expressed consistently by the same term, and others still are reflected in varying degrees of lexical ad-hockery.

4.7 Covertness

In studies of folk classification Bartlett [Bartlett, 1940: 354] long ago spoke of 'covert families', but it was Berlin, Breedlove and Raven [Berlin *et al.*, 1973] who were the first to identify the existence of large numbers of such hidden categories or complexes whose existence can be inferred although they are not labelled. Since then some have extended and refined the concept [e.g. Berlin, 1976; Hays, 1976; Hunn, 1977b: 36–8; Taylor, 1984a; Taylor, 1990: 42–51], while others have criticized it [e.g. Brown, 1974]. These critics have suggested that it may be an artifact of taxonomic

method and its associated elicitation techniques. Thus, slip-sorting methods, which anyway often require semi-literacy, generate covert categories through the pressure on respondents to 'group' and especially to justify residues. Categories elicited in such contexts often have no permanent existence. I am inclined to share many of these doubts, in that I am convinced that methods have undoubtedly affected results, even though it has long been acknowledged that we must rigorously separate labels from categories [Conklin, 1962], and therefore might be expected to be prejudiced against the existence of non-labelled categories before further evidence has been assembled to disprove their existence. But it is precisely because of such methodologically-induced scepticism that the persistence of ethnographic reports of their existence must be treated seriously; especially because it is evident from our own experience that we are constantly employing and constructing categories which have no label or at least no consistent or agreed or widely-shared one. We must distinguish between named categories and a statement that explains an otherwise unnamed category.

There is evidence to suggest the existence of covert categories at all degrees of inclusiveness in Nuaulu animal classifying behaviour, although, unlike Tzeltal intermediates [Berlin, Breedlove and Raven, 1974: 329], those of the Nuaulu are neither necessarily taxonomic nor morphological. Some superordinate life-form type categories have already been mentioned in section 4.3, and covert terminal categories in chapter 3.

I have inferred the existence of covert categories from the following evidence:

(a) respondents' performances in card-sorting tests [but see Taylor, 1984a];
(b) cross-contextual statements involving hedging phrases such as 'rather like an *x*' [see Taylor, 1990: 43];
(c) the existence of multiple similarities between categories not otherwise grouped together through labelling practices e.g. pseudo-covert FROG and TURTLE [see Taylor, 1990: 47–51];
(d) inference of superordinate covert categories when the semantic contrast among categories is clear [Taylor, 1990: 46–9.], or co-hyponymy [Taylor, 1984a: 112];
(e) statements of informants identifying collections of categories as a group despite the absence of a label (e.g. if there are names for birds but not BIRD, then we can posit the category);

(f) if it is evident from the definition of these various terms, or if in linguistic contexts they are similarly treated (thus animal hair is different from human hair, the verb 'to kill' is different for humans and animals, and so on [Taylor, 1990: 47, 49–50]. Taylor [1984a: 114] calls this definitional implication);

(g) the chaining effect [e.g. Hays 1976: 502]. Thus, if a is linked to b, b to c and c to d then this implies the existence of a group a–b–c–d;

(h) if the existence of intermediate covert categories can be inferred from patterns of variation between informants [Hays, 1976: 496]. Informants' identifications of particular specimens tend to vary, but all names offered are restricted to a range of related names which suggest the existence of some notional grouping (though not always named). Thus if *y* and *z* are consistently offered as variants, and *x* not at all or rarely, then this suggests that *y* and *z* are related in a more inclusive sense; and

(i) where sexually dimorphic species are recognised by two separate terms but where no single inclusive term exists. This is obviously the case with terms for *Phalangers:*

mara osu (♀) mara kokowe (♂)
----> 0 *(Phalanger orientalis)*
mara makinete (♂) mara siha (♀)
----> 0 *(Phalanger maculatus)*

There is also the case of the domesticated fowl:

man tulalakane (♂) man winai (♀)
----> 0 *(Gallus gallus)*

In both instances a superordinate category is encoded into a binomial, in the case of the *Phalanger* it is the immediately next-inclusive category (the phylogenetic genus), but in the case of domestic fowl the classificatory status of the prefix is ambiguous. In general Nuaulu usage **manu** is 'bird', but more narrowly it may sometimes refer to domestic fowl alone, in which case the usage is similar to the partitioning of the category **marane**.

4.8 Transitivity

Perhaps the major logical impediment to any claim that the Nuaulu domain of animals might be ordered taxonomically, and conceptualised neatly in its entirety, is the difficulty of eliciting transitivity statements of the kind: *x* is a *y* and *y* is a *z*, therefore *x* is a *z*. Thus, the symbolically salient moth **peni wanue** (appendix 9) is variably linked by informants to

the more general term **inahai** (in this sense, nocturnal *LEPIDOPTERA*). All other possible members of this category are simply named by adjectivally qualifying the more general term (e.g. **inahai putie**, 'white moth'). Despite this evidence, we might reasonably infer on comparative grounds that **peni wanue** is indeed a member of the category **inahai**, though perhaps a peripheral one. In turn, **inahai** is sometimes (though occasionally) prefixed by the term **kori-kori** (variably all *LEPIDOPTERA*, narrowly diurnal forms). Clearly, **kori-kori** and **inahai** are closely linked, though not always in a 'kind of' relationship where **inahai** may be a kind of **kori-kori**, but never the reverse. But although for some people, some of the time, **peni wanue** is a kind of **inahai**, and **inahai** a kind of **kori-kori**, no one, in any circumstance, was prepared to admit to the possibility that, therefore, **peni wanue** might be a kind of **kori-kori**.

The relationship between **kori-kori** and **inahai** indicates the existence of alternative overlapping grouping strategies of an intermediate kind. These may take the form of contrasting *basic* categories or they may be represented in terms of a 'kind of' transitive relationship, where one takes on life-form qualities while the other remains intermediate or basic. In this sense **inahai** is not as 'good' a member of the category **kori-kori** as, say, **kori-kori masikune**.

If some animals are less good members of certain classes than others, and membership may depend on context, then classifications may appear to overlap. Nuaulu ethnozoology reveals a high frequency of cross-cutting classifications based on different criteria, often the main feature of intermediate classifications. Indeed the scope for alternative arrangements may be greater at this degree of inclusivity than at any other. For example, land snails can be assigned morphologically and morphosyntactically to the generic category **nunu** (shells). Within this category they contrast with both freshwater shells (**nunu waene**) and marine shells (**nunu nuae**). But both these latter categories can also be assigned on the basis of habitat to a general category of aquatic animals which includes fish and other invertebrates, in the sense connoted by folk-English 'shellfish'. This, of course, excludes terrestrial **nunu**. Most folk classifications are in some way ambiguous and cross-cutting; it is only the comparison with scientific taxonomies which suggests that they should not be. While we should not confound the two analytically [Hays, 1983: 594], much of the validity of the purist distinction between 'real' animal classifications (that is those based on primary morphology) and special-purpose (utilitarian ones) fades away in any empirical examination of classifying activity in natural ethnographic settings.

4.9 Conclusion

It is now possible to draw some tentative conclusions concerning Nuaulu use of more inclusive animal categories.

1. Since for pragmatic and zoological purposes (identification, contradistinction etc.) categories above the basic 'level' are only rarely required, and since they occur infrequently in Nuaulu speech, the categorical inferences which can be drawn provide only a cognitive habitus in which to set other categories: the reflexivity in lower categories is entirely different from that involving major categories. It is a distortion to present them as part of a single unitary taxonomy. The degree of agreement on so-called life-forms is highly variable, and highly contextual too. I would be forcing the data, and compromising the ingenuity and flexibility of Nuaulu classifiers, if I represented their various discriminations by a single folk model, or attempted definitively to list their 'life-forms'. What we have are only the representations of so many individuals which to varying degrees coalesce and overlap.

2. There are two dangers inherent in some previous methods for eliciting folk classifications of animals. Some have employed a method based on assumptions of the critical significance of features, and assume an underlying taxonomic structure. Some have rigorously excluded most non-morphological criteria. Those who have not, have found themselves in danger of finding as many classifications as there are criteria. Since the former do not expect to find, and perhaps would rather not find, non-morphological criteria affecting more inclusive categories, when these are found they are dismissed as 'cross-cutting' or 'special purpose' and assigned to another domain. Such observers do not seem to realise that the protagonists themselves seldom see it this way, or if they do, regard it as an irrelevant cultural intrusion. To the Nuaulu you classify animals according to criteria that seem relevant at the time. In this sense they are all 'special purpose'; or as I would prefer, aspects of a single dynamic conception of the relations between animal categories. It is only in this sense that the word 'system' even begins to become impressionistically appropriate. Those who seek to provide a rigorously 'linguistic' description, which sometimes seems to mean no more than formal semantic analysis, have tended to go far beyond linguistic inference in their reconstructions, though nevertheless adopting rigorous componential definitions which exclude the possibility of cross-cutting arrangements [Taylor, 1990: 50]. It is no longer acceptable to treat knowledge as if it were stored and related in terms of gigantic cognitive trees, although on

occasions these may be constructed for special limited purposes, or may arise through the eliciting techniques employed by anthropologists and linguists. Indeed, 'descriptions of human belief are usually psychologically inaccurate because they fail to distinguish mentally stored old knowledge from new knowledge spontaneously produced by reasoning' [Randall, 1976: 545]. The centrality of prototypes in classificatory behaviour with respect to animals – at various degrees of inclusiveness – tends to render the idea of multi-levelled hierarchical systems of relatively little use to the pragmatic (and even symbolic) circumstances of Nuaulu life.

3. If pressed to provide a description of Nuaulu animal classificatory space beyond the basic level, I would say that it consists of a constellation of small taxonomic-like arrangements and monotypic categories arranged between the polar values 'familiar' and 'unfamiliar' [Bulmer *et al.*, 1975: 292]. Beyond this, the more inclusive categories are characterised by ambiguity, variability and cross-cutting ties. There is nothing cognitively anarchic about this; it allows for a high degree of invention and flexible response to different situations and contexts. Since there is some uniformity in the situations in which classifications are used, then one would expect certain corresponding similarities in classifying behaviour. More inclusive categories are not simply lying dormant waiting to be recorded by the ethnozoologist, but are frequently *constructed* or *re*-constructed as a response to particular situations. In view of this it is understandable that tests revealed that informants habitually found it necessary to allocate species to a larger number of groups than one would expect in comparable tests performed on Europeans and trained biologists. It is only the intrusive example of scientific taxonomies which makes us doubt that they should indeed be otherwise. Of course, as social reasons arise which require or encourage greater agreement about more inclusive categories, so the area of consensus is broadened and the effective criteria are reduced. There is not much use for such categories in Nuaulu society. In contrast, in European and American culture high social value is placed on knowledge of higher-order groupings, in terms of scientific utility and the status of arcane knowledge (for knowledge's sake).

4. More inclusive Nuaulu animal categories differ from terminal categories not only in that they bear much less resemblance to objective biological facts [Bulmer, 1967: 169]. Following Hunn, 1977b: 59, we may distinguish classifying processes with respect to the least inclusive categories, and the increasingly more inclusive, in terms of the ratio of

induction to deduction: categorical recognition of natural kinds is established inductively, though deduction may play a part; as we move to more inclusive categories so the degree of deductivity increases and in places may be paramount. As with more inclusive units in the Linnaean hierarchy, non-basic folk categories cannot be objectively defined. They are no more than collections of species which have no separate existence in nature. Categories may be based on crude prototypes of varying degrees of phylogenetic equivalence, or may be determined by a few key features. In both cases ideological factors intrude much more obviously into biology. This is partly because with such a variety of possible criteria to adopt in grouping animals, and no obvious biological features to give precedence to, cultural fiat provides a convenient device for managing an enormous amount of information about the natural world. Put differently, the presentation of at least certain key classificatory relations 'as if they were natural' in terms of more abstract and simplified concepts, provides for a 'higher order' control hierarchy. The higher the level of control, the more general and vague moral and mythic injunctions become. This is no less so in animal classification than in any other area of knowledge. If people have to talk about animals for whatever reason, the categories and relations of discourse must be sufficiently shared and must at least be assumed to be fixed. And if the natural discontinuities of nature do not provide any obvious regularities, or if they do provide a few which are ambiguous in the context of human cognitive logics, then a core of intersubjectivity must be enforced through sanctification. Sanctification, which is the foundation of symbolic discourse, transforms 'the arbitrary into the necessary, and regulatory mechanisms which are arbitrary are likely to be sanctified' [Rappaport, 1971: 33–34]. This does not occur through the force of some unseen evolutionary hand, nor does it in all cases require ideological imposition through structurally dominant groups or individuals. This latter may certainly be important, depending on the character of the social formation, but its minimal condition is simply the necessity for ordinary people to operate within the basic framework of notional agreement. There is nothing mysterious about this, and it happens all the time with language: sanctity may arise through consent.

5

Consistency, sharing and flexibility

Like everything else interesting, classifying involves judgement, and in matters of judgement even men of good will can disagree [Knight, 1981: 27].

5.1 Introduction

Despite some determined efforts to eliminate him, must published reports on ethnobiology still list folk categories and classificatory constructs on the basis of the hypothetical omniscient 'speaker–hearer'. Much the same is true for the ethnographic analysis of any kind of category. This non-existent figure has the distinction of possessing a maximum knowledge of the corpus under examination, the sum total of the knowledges of all persons consulted, without reflecting the practical (and generally partial) knowledge of individuals or indicating the dimensions and degree of variation. Yet if data are assembled using this heuristic device, they will always be in excess of those pragmatic competences common to all individuals. Moreover, they will not reveal unique abilities or those shared by only part of the population. These are matters which may be of considerable sociological significance. So, since there is a large area with an uneven range of abilities, and since no techniques of elicitation are ever completely exhaustive, variation must be expected from any corpus, even if the data provide no means of revealing it.

There are a few early references in the ethnobiological literature to variation[1] between individuals and between groups [Henderson and Harrington, 1914: 8]. In some recent publications, it is recognised as a problem area [Berlin *et al.*, 1974: 58–9; Gal, 1973; Taylor 1990: 3–4], and the measurement and significance of individual variation is touched upon by Frake [Frake, 1969 (1964)], Romney and d'Andrade [Romney and

D'Andrade, 1064], Werner [Perchonock and Werner, 1969] and others. However, there have been only limited attempts to tackle it as an integral part of the theory and structure of classification systems [c.f. Wallace, 1970]. In the past, this was partly due to assumptions about the shared nature of culture, but also to the small size of the samples involved. With the larger samples of more recent work, patterned variation is inevitably revealed. However, little quantitative information has been presented on the distribution of response variability in interpretations, between informants according to such normally important variables as geography, age, gender, kinship affiliation, ideology, degree of literacy and so on [Hunn 1975b: 16–8, 21; Manning and Fabrega Jr, 1976: 41–3]. Two notable exceptions are found in the work of Gardner [Gardner, 1976] and Hays [Hays, 1974; Hays, 1976]. Mention should, additionally, be made of an important ethnographic study of variation in terms and ornithological knowledge published by Verheijen for Manggarai, Flores [Verheijen, 1963: 711–2]. He recorded 489 terms, but most of these he admits to be free variants of synonyms for 110 standard names. The average man knows 40–50 terms. Although my own Nuaulu enquiries have extended to most major groups of animals, the illustrations used here are limited, having been largely drawn from an analysis of categories for amphibia and reptiles [Ellen *et al.*, 1976a; Ellen *et al.*, 1976b]. Part of this work has been directly concerned with mapping and measuring variation in classifications by individuals, how this varies according to context, and how absolute zoological knowledge of a particular domain varies within a community. There are, then, here two types of knowledge (as stressed by Hays, 1974: 304): familiarity with animals as objects (empirical or encyclopaedic knowledge) and a more abstract knowledge (the animal world as names, and as conceptual arrangements of categories), and these are not necessarily consistently associated [Hays, 1974: 285–6].

In this chapter I discuss some of the problems raised by measuring variation, and survey its possible causes in terms of differences between individuals, contexts, and the properties of various kinds of natural species involved, as well as interference from the methods employed. I argue that this provides the means of placing the study of classification systems in a firmer sociological context, allowing us to see how arrangements of categories relate to concrete usage situations, rather than relegating their analysis to broad speculation about mental principles of cognition.

5.2 The measurement of variation

Given the existence of variation, it is necessary to find some standard from which it can be measured. With biological taxonomy in the scientific community, this standard is embodied in a widely agreed upon written record and set of conventions. It has authority which stems from a recognised pedigree, general convenience, and a respect for precedence. Most importantly, it is constructed around evolutionary theory, its units being at least putatively genetic or phylogenetic groupings. Prescriptive codifications meticulously determine nomenclatural usage.

For the folk classifications of many small-scale societies there is no written record. Authority may come from persons respected for their knowledge of certain matters or their ascription or achievement in other fields; it may come from oral tradition and normatively accepted notions as to the order of the natural world. In such situations, contradiction (sometimes self-contradiction), variation and flexibility must be expected as a normal characteristic of classification systems [Bulmer *et al.*, 1975: 24; Tyler, 1969: 5], and the premise of a 'correct' or 'true' identification must be more difficult to establish in fact [Bloch, 1971: 86]. As Bulmer [Bulmer, 1969: 6] comments:

> The terms used to denote the units of a folk taxonomy are part of natural language, and as such can be used intuitively, imaginatively, with different referents in different contexts, in contrast to terms used in biological taxonomy, usage of which is explicitly restricted with the object of minimizing ambiguity.

Part of the problem facing anyone concerned with making sense of this kind of classification is precisely that many analysts have *a priori* attributed to them the characteristics of the scientific, phylogenetic scheme of things. We cannot assume that the kind of logic employed in folk classification is simply discovered through the distinctive-feature analysis (usually based on binary discriminations) developed by post-Linnaean taxonomists. 'If taxonomies could be satisfactorily analysed in terms of straightforward series of binary oppositions applied to single characters', writes Bulmer, 'the most economical way of glossing terms applied to these would be to codify ... [them], and to that extent zoological identifications of the creatures classified would be redundant' [*ibid.*: 4].

The analogy of phylogenetic taxonomy has led to the concealment of variation and a blindness to the idea that definitive attributes may, in fact, keep changing. One individual may see p, q and r as the distinctive characteristics of Δ, another may select r, s and t, and the same person, on another occasion, may decide on t, u and v. Here no single feature is essential for membership of a category, nor is any such feature sufficient for membership. It is very likely that such polythetic processes explain a

considerable amount of the apparent variation in folk classifications [Ellen, 1979a; Needham, 1975: 349–50], although it by no means explains why particular features are chosen.

The polythetic model, rather than conceiving of categories in terms of the presence or absence of particular features (which may be appropriate in any single elicitory context), sees them as configurations of features, where emphasis on a particular one varies according to context or individual. Whether anomalies are endemic or exceptional therefore becomes a question of circumstances, and particular anomalies may depend very largely on the context of elicitation [Ellen, 1975a: 211–8, 221]. This notion of a configuration of features has led some commentators to talk in terms of *mental images* [Bulmer and Tyler, 1968; Hunn, 1973; Simpson, 1961, 1961: 12]. But such a concept seems altogether *too* holistic and rigid, given some of the recent empirical and experimental evidence. *Gestalt* is better [cf. Hunn, 1975a: 10–3], but we might do well to remember that, in this case, we are dealing with gestalts that are by no means fixed and often vary according to context.

Physical nature may well condition and constrain classification and on occasion the degree of consensus might be quite remarkable, but it is of great importance to stress variation between individuals and collectivities in their knowledge of actual species, of lists of names and categories, and the ways they arrange these in classifications, as well as variation in knowledge and classification through time and according to changing contexts [Bricker, 1974; Ellen, 1975a; Ellen, 1978a; Friedberg, 1974; Harris, 1970: 12; Hays, 1974 and work cited, p. 359, footnote 8; Manning and Fabrega Jr, 1976: 42–3, and works cited; Rosaldo, 1972: 83–4; Sankoff, 1971]. The greatest problem so far has been to record and work out the degree and significance of elasticity. In domains where the dimensions of variation are limited, a greater degree of success has been achieved [Hage and Hawkes, 1975; Heider, 1972]. For example, categories of colour may be, and often are, abstract summary terms, or may be based on a very particular aspect of what is observed. At least, the ethnographer with his Munsell colour ships assumes this to be the case. The dimensions of variation are therefore artificially limited. The problems attached to the measurement and understanding of variation for the complex categories of natural species are much more formidable.

5.3 Types of variation

In measuring variation we are generally dealing with three variables: lexical items (L), the content of categories in terms of scientific taxa (X), and informants (I). Others, such as knowledge of uses, could be added, but

as yet this is an aspect which has not been given wide attention [but see Hays, 1974: 305–39]. Moreover, although the non-congruence between words and categories is well understood, it is generally assumed that lack of congruity and the existence of covert categories can, in most cases, be ignored, and that they inevitably must be so if measurement is to be a possibility. Given this, we can go on to distinguish three basic kinds of variation:

(a) variation in the relationship between lexical items and scientific taxa;
(b) variation between informants; and
(c) variation according to rules appropriate to specific contexts.

These can be described, respectively, as *consistency*, *sharing* and *flexibility*. However, in discussing the dimensions of variation, it is convenient and illuminating also to distinguish between *identification* and *classification*, the difference between the way in which informants assign observed specimens to categories and the way in which categories are arranged into more inclusive groups (chapter 3.1). Combining these two set of distinctions, we get the following matrix:

	consistency	sharing	flexibility
identification	1	3	5
classification	2	4	6

Variation between lexical items and scientific taxa is about *consistency in identification*. Thus, the majority of a series of Nuaulu informants associated the frog **kere** with specimens of *Platymantis papuensis* and only one with *Rana modesta* [Ellen *et al.*, 1976b: table 2]. On the other hand, *R. modesta* was labelled by nine individuals as **notu** and by only one as **kere** [c.f. Hays, 1974: 185–6].

One way of measuring this kind of consistency is the calculation of M, the proportion of informants opting for the most frequently cited item, or, alternatively, the proportion of informants opting for the most frequently cited taxon. However, M gives no indication of the diversity of labels employed, and its accurate use depends on the solution of a number of additional technical difficulties. The use of a different measure, p, permits us to increase the element of predictability, while V, a measure of qualitative variation taking into account all features of the distribution of responses, compares the actual extent of disagreement with the maximum conceivable extent. D and $\bar{D}$ provide measures of deviation from a criterion distribution. In table 5.1, these various measures, which have been discussed in more detail by Reason [Reason, 1979a], have been

Table 5.1. *Some measures of consistency in the application of terms to amphibian and reptile species by Nuaulu informants. Based on 245 informant responses for 182 specimens [Ellen et al.: 1976a, 1976b]. Species are ordered by zoological class in terms of decreasing 'M' values*

Amphibia	n_i	n_j	N	L	M	Δ_p	V	$\bar{D}$	$\hat{D}$	No. of specimens
Rana sp.	12	12	1		1.00	0.00	0.00	0.00	0.00	12
Litoria infrafrenata	1,11	12	2		0.92	0.42	0.31	0.70	0.04	12
Rana modesta	9,1	10	2		0.90	0.40	0.36	0.64	0.04	7
Litoria amboinensis	6,1	7	2		0.86	0.36	0.49	0.51	0.08	6
Litoria sp. (bicolor group)	3,7	10	2		0.70	0.20	0.84	0.16	0.36	6
Phrynomantis fusca	2,1	3	2		0.67	0.17	0.89	0.11	0.44	3
Platymantis papuensis	2,6,6	14	3		0.45	0.12	0.92	0.08	0.80	7
Reptilia										
Cuora amboinensis	2	2	1		1.00	0.00	0.00	0.00	0.00	3
Gekko vittatus	1	1	1		1.00	0.00	0.00	0.00	0.00	1
Varanus indicus	7	7	1		1.00	0.00	0.00	0.00	0.00	3
Eugongylus rufescens	1	1	1		1.00	0.00	0.00	0.00	0.00	1
Python reticulatus	5	5	1		1.00	0.00	0.00	0.00	0.00	5
Acanthophis antarcticus	3	3	1		1.00	0.00	0.00	0.00	0.00	1
Dendrelaphis pictus[1]	8,2	10	2		1.00	0.00	0.00	0.00	0.00	2
Boiga irregularis	5,3	8	2		1.00	0.00	0.00	0.00	0.00	3
Hemidactylus frenatus	1,50	51	2		0.98	0.48	0.08	0.92	0.00	42
Emoia cyanura	9,1	10	2		0.90	0.40	0.36	0.64	0.00	7
Calotes cristatellus	21,3	24	2		0.88	0.38	0.44	0.56	0.06	14
Candoia carinata	7,1	8	2		0.86	0.36	0.44	0.56	0.06	7
Dasia smaragdina	2,1	3	2		0.66	0.16	0.88	0.12	0.44	2
Mabuya multifasciata	7,17,3	27	3		0.63	0.30	0.78	0.22	0.45	21
Mabuya 'rudis'	2,2	4	2		0.50	0.00	0.00	1.00	1.00	4
Carlia fusca[2]	2,1,5	8	3		0.50	0.17	0.80	0.20	0.44	7
Draco lineatus[3]	1,1,1,2	5	4		0.40	0.15	0.96	0.04	0.64	5
Emoia kuekenthali	–	–	–		–	–	–	–	–	1

Note: 1. *Dendrelaphis pictus* is a species for which the Nuaulu use different terms for the mature and immature stages. Terms were applied only to specimens of one species, and at this level must therefore be said to be used consistently. However, there is evidence for inconsistency in the use of species-specific terms for the different development stages.
2. *Carlia fusca* and *Carlia* sp. are treated as a single species.
3. Refers to identification with the term **hohone** and not sub-specific terminal forms within this category.

applied to data on Nuaulu identification of amphibians and reptiles, where *N* is the total number of responses from different informants and the *L* the number of different lexical items applied to the taxon.

Clearly, the significance of the measures is very much dependent on the representativeness of the informants. When dealing with such small numbers of people and specimens, the variable context of the naming task, the variable adequacy of stimuli, 'pseudo-compliance', uncorrected

errors in naming and responses of varying degrees of specificity are all going to affect the outcome [Hays, 1974: 262–75]. For example, *M* values of 1.00 indicate a high degree of consistency. This seems probable for common and 'significant' species such as the monitor lizard, *Varanus indicus*. But although many were seen and informally identified, only three were actually collected. On the other hand, some species with values of 1.00 are much rarer (e.g. the death adder, *Acanthophis antarcticus*), and it was precisely for this reason that it was impossible to obtain many specimens. Had there been more specimens, there might have been more disagreement. Only larger, more statistically significant samples, uniform numbers of identifications and specimens for each species, and the removal of other interfering variables would allow us to place a general confidence in such measures. Until then, they are at best indicative of tendencies which must be interpreted carefully in the light of the unmeasurable experience of the researcher.

Consistency in classification concerns variation in the relationship of non-terminal lexical items (or categories) and their content in terms of scientific taxa. For example, the Nuaulu apply **tekene** to most snakes, but may sometimes include certain species of fish and exclude certain other snakes. **Peni**, on the other hand, invariably refers only to cassowary, pig and deer, while **manue** includes all birds but sometimes excludes the cassowary [Ellen, 1975a]. Now, in the first case, the variation is partly due to the memorate knowledges of different informants and is perhaps also a function of the artificial elicitation situation. In the second case, there is the additional factor of variation according to rules appropriate to particular social contexts. There is thus overlap between cells 2 and 6 of the matrix.

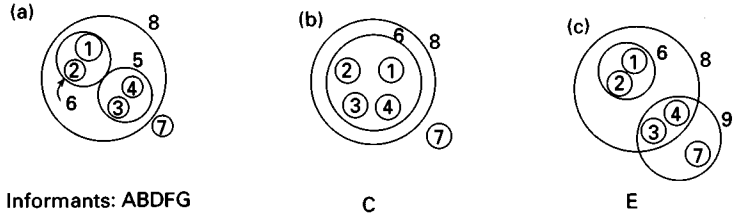
Variation between informants covers measures of the extent of sharing of particular lexical items, lexicon size, numbers of categories, knowledge of scientific taxa, uses and suchlike. It may combine this with the issue of consistency of identification, through a concern with the variation between informants in the way in which they assign scientific taxa to particular lexical items, and the frequency of variation in naming responses. It may combine it with classification in the comparison of profiles of individual taxonomic models [Hays, 1974: 237], or in attempts to show how specific classificatory structures vary between individuals. This can be done through the use of tree-diagrams elicited from individual informants [e.g. Coxon, 1977]. Gardner [Gardner, 1976: 455–7], on the other hand, has used Venn diagrams to show variation in bird domain shape. Venn diagrams have certain advantages over 'trees', one being that they are more appropriate indicators of 'fuzziness'. I have collected Nuaulu data using card-sorting techniques, which could be represented in

either way. For example, figure 5.1 illustrates three different ways in which informants classified one portion of the category **poso**, in this sense including all 'lizards'. But because of doubts about the statistical validity of these data, I have preferred to see them simply as an indication of the possible dimensions of variation rather than as any precise measure of distribution. Furthermore, Venn diagrams, like taxonomies *sensu stricto*, assume that classificatory space is two-dimensional. There are good reasons for portraying classifications and their individual variants as three-dimensional networks (see below), but the technical problems in doing so are formidable. Accordingly, I have tended to incorporate data on variability into general charts represented as taxonomies (e.g. figure 5.2). These may serve as perfectly convenient indicators of variability without suggesting that they have the accolade of statistical authority.

Every adult Nuaulu shares a basic *core* (*N*) knowledge of the names of around 400 terms. In fact, this is a high proportion of the total number (462). In addition, each adult Nuaulu generally has knowledge of additional terms (*n*) which he or she may share to a lesser extent. Thus, the knowledge of terms for each individual can be represented as $N + n$. The difference between N and $N + n$ can be accounted for partly in terms of the specialised knowledge of particular *groups* and *individual* skills. Of course, not all adults have knowledge of every *N* term, but most do. More importantly, knowledge of names is not the same as knowledge about animals; neither does it necessarily indicate an ability to identify them accurately and consistently. Measuring this is complex, as Hays has demonstrated.

One problem with attempts to measure variation between individuals is that it is often unclear to what extent sharing is in fact flexibility. *Flexibility in identification* refers to context-dependent variation in the

Figure 5.1 Variation between informants in classifying one portion of the Nuaulu category **poso** (lizards). All identifications in this and subsequent figures in this chapter are those most frequently provided.



Key. 1. **kasa'un**$_2$, *Calotes cristatellus*; 2. **hohone**$_2$, *Draco lineatus* (flying lizard); 3. **isa**, *Hydrosaurus ambionensis*; 4. **puo**$_2$, *Varanus indicus* (monitor); 5. **puo**$_1$; 6. **kasa'un**$_1$, agamid lizards other than *Hydrosaurus*; 7. **puha**, *Crocodylus porosus*; 8. **poso**$_1$, all 'lizards'; 9. covert category.

relationship between terminal lexical items (or categories) and scientific taxa. By this I am not referring to situations in which an informant may label a taxon in a particular way because of inadequate stimuli, 'pseudo-compliance', uncorrected errors, or lack of specificity (see above), but to regular rule-guided variation according to context. For example, certain Nuaulu categories for skinks (**poso**) may be used interchangeably for the same scientific taxa, or several taxa may be described on different occasions by the same label [Ellen *et al.*, 1976a]. The term employed very much depends on the contrasts it is necessary to make in a particular speech situation. Logically, we should also admit at this point variation in identification governed by rules appropriate to definable social contexts – ritual, economic and so on – but I have no information to suggest that the Nuaulu makes these discriminations. What is certain, though, is that classifications may vary according to rules appropriate to specific social contexts [Ellen, 1975a; Rosaldo, 1972]. I discuss this matter further below.

5.4 Causes of variation in knowledge, identification and classification

That informants vary in their empirical knowledge of animals, the identifications they make of particular species and the broader categories to which they assign them is by now palpable. What is still unclear is the sociological significance to be attached to this in the analysis of a particular body of material. From the analysis of Nuaulu classification of amphibia and reptiles, it is clear that *in general* Nuaulu identifications are reasonably consistent, that the degree of sharing is extensive, and that the range of flexibility is confined, although apparently not so impressively as among the Kalam [Bulmer *et al.*, 1975: 274]. There is, then, a hard core of intersubjective agreement. At least, this appears to be the case, given the known limitations of techniques and evidence. This is consistent with Nuaulu theory which states that animals should have names, that these are *correct* names, and that these are given by the ancestors. But, however much this may be so, it is of no practical help in settling the issue of what is and is not a correct identification. In the absence of the scientific literate authority of books (such as encyclopaedias and floras), identifications are confirmed as correct or otherwise by a combination of discussion among multiple individuals, or deferment to those in authority, usually elders, because of their mastery of ritual or practical knowledge. There is, of course, no guarantee that the name confirmed is that employed beyond any question of doubt, and it is perhaps this that is one of the sources of change in the lexica for biota.

In certain areas, however, Nuaulu identifications are remarkably incon-

sistent and classifications are variable. This can be attributed, in part, to a relative absence of sharing between different subgroups, but there are also determinants affecting the group as a whole. For example, it has been suggested that migration, resettlement and economic change have combined to alter the cultural significance of frogs, with the result that while the names remain, the experience necessary to employ them constantly, consistently and perhaps also accurately is lacking [Ellen *et al.*, 1976b]. There are also cases where the employment of 'loose labels' – shared terms with no clearly defined referents or defining attributes [Hays, 1974: 284; Hunn, 1977b: 36–71] – is intentional (see above). But what can be said in general about the conditions that affect identification?

Here, I isolate four basic sets of variables, although none appears to be acting independently. The groups do not, therefore, indicate mutual exclusiveness. They are:

1 informant variability (according to age, gender, status, motivation and so on);
2 contextual variability (linguistic, social, ecological and economic contexts);
3 variability in the properties of different kinds of natural entity; and
4 methodological indeterminacy.

5.5 Informant variability

Hays has listed the total knowledges for individual Ndumba informants. I have found this difficult to do in the field, since I found that the knowledge any one individual has on recall varies over time and through interaction with other individuals. I am also doubtful of the value of looking at *individual* variation when many decisions regarding identification and classification of fauna are in real life arrived at collectively, especially where there is an element of doubt, or in situations where variation is of absolutely no consequence.

(a) Age

Nuaulu children acquire knowledge of animal species gradually and unevenly, as they obtain familiarity with an increasingly wide geographical area. There is an initial bias towards the domestic context: they become familiar with animals found around the village and with game animals brought in as meat. Some individuals have to wait until they are quite old before they see (let alone recognise) certain animals, and some young initiated men have never seen civets such as *Viverra tangalunga* and

Paradoxurus hermaphroditus. The implication of this seems to be that because an individual has to acquire knowledge of animals, the older he or she is the larger the lexicons, the greater experience, and therefore the more expert the identification [c.f. Hays, 1974: 209–19, 254]. However, quite apart from the interference of extraneous variables associated with socialisation – the development of skills, gender, status and so on – age ultimately brings with it physical and mental disability, if not in terms of finite knowledge and experience, then in ability to perceive, recall and connect.

(b) Gender

Differences in socialisation between the sexes affect the relative knowledge of different kinds of fauna. The knowledge of men and women regarding different domains varies according to the social division of occupations. Women tend to have a more detailed knowledge of the littoral, shellfish, freshwater fish and crustacea, than men, owing to their pre-eminent role in fishing activities. Men, on the other hand, are more expert when it comes to forest fauna. The marked influence of gender on plant knowledge, the number and proportion of names shared, has been confirmed empirically for the Ndumba of the New Guinea highlands by Hays [Hays, 1974: 224, 254]. With no permanent residential segregation of adult makes and females among the Nuaulu, one might expect the pattern to be somewhat less marked and more muted. Whether or not this is the case has still to be determined.

(c) Status and kinship position

While knowledge of natural history may itself give an individual status, those persons who have it by virtue of ascription or some achievement (reputation in warfare and headhunting, in terms of personal wealth, as a shaman, magician, wise man, and so on) may be regarded as authorities in this sphere. This is so even if, in any objective sense, they are patently not. Bulmer and Tyler [Bulmer and Tyler, 1968: 347] have pointed out that a leading man cannot afford *not* to be an authority on any topic. With the Nuaulu, as with the Kalam, in the great majority of disputes over botanical or zoological identification, such persons are usually deferred to, at least in their presence, though younger men and boys occasionally continue to assert divergent opinions in their absence [Ellen, 1975a: 220]. All this merely confirms what is already known of the role of political and ideological hegemony in other fields of knowledge. Persons of status may also show a greater aptitude and have a greater opportunity for acquiring

such knowledge than others. The whole thing is a self-amplifying process, as with the relationship between education and status in stratified societies.

Status may also be relevant in another sense, in that for totemic and other clan-specific reasons an individual may be prevented from having access to particular groups of animals or environments. For example, the clan Sonawe-ainakahata is forbidden to have anything to do with the sea, while the fact that snakes are totemic beings for Somori restricts greatly the knowledge of this group's natural history among its members. There are also individual familial traditions. On the other hand, the esoteric knowledge of certain animals may be passed on within certain descent groups and families and not within others. Differential socialisation experience may therefore be important.

(d) Linguistic competence

Most adult Nuaulu are at least bilingual, speaking, in addition to their own tongue, either AM or Sepa. Many, particularly adult males, but also some women (particularly those marrying into the group), speak a third language, and a few speak more than this. I have discussed this in detail in chapter 2.

Multilingualism affects the kind of variation in indigenous classification systems, but, as the knowledge of a second language is seldom as detailed as that of the first, its effects seem to be restricted to more-inclusive categories. That is, terminal categories (unless these are also primary) tend to be affected less than those for groupings of the kind 'things that fly', 'big game', 'snakes' and so on. Also women or men marrying in from different geographic areas may simply increase the number of names available.

(e) Ability and special skills

Apart from the social determinants discussed above, knowledge of fauna may be affected by physical and technical ability. To a considerable degree physical ability is tied up with age, the learning of special sensory and motor skills and their deterioration. Physical disabilities of other kinds may also be relevant, particularly those that impair travel and the senses. Puete, a crippled polio victim in Rohua, had little knowledge of natural history outside the village, although this was compensated for by knowledge which her permanently sedentary existence allowed her to accumulate. Aharena, a deaf-mute in the same village, suffered from difficulties in communication, although she was sensitive to those aspects of natural history that her effective senses encouraged.

Mental ability must clearly also be relevant, though there was no way of judging its effect except by very crude means, and then its existence as an independent variable is extremely doubtful. It was clear, however, that certain individuals possessed skills which made them knowledgeable in particular areas of natural history. Generally, there were good social reasons for the distribution of these skills. The limitation of knowledge by status is one of these, marital state is another, and family tradition is yet another. But it is also the case that particular skills, however originally acquired, are often developed through interest and desire to concentrate on those areas where competence is high. There may also be other factors involved, such as contact with outsiders and other individuals possessing special skills. Opportunities for communication of information from other people are always important in this connection.

Two examples of this kind of situation should suffice. Naupati Matoke, an unmarried man, was particularly renowned as a hunter, but that he could devote so much of his time to this activity was largely due to his lack of kinship and affinal responsibilities. As a result, his knowledge of the natural history of the more distant forest regions was probably unparalleled. A rather different case was Komisi Somori, the village headman of Rohua, who spent a large proportion of his time engaged in inshore fishing. First, this was possible because there were no clan restrictions preventing him from doing so. Secondly, his status as headman required him to be constantly within easy reach of the village to entertain travellers and other guests. Hunting, forest collecting and gardening activity would not be compatible with this. As a result, he had perhaps the most detailed and accurate knowledge of marine fauna of anyone in the village.

5.6 Contextual variability

Different classifications, or identifications, may be elicited according to different contexts: linguistic, social or ecological [Ellen, 1975a]. Put differently, a category (at whatever degree of inclusiveness) may belong to several superordinate categories, and many criteria may be involved in grouping: morphological, anatomical, utilitarian or ecological [c.f. Friedberg, 1971]. Conflicting classifications may emerge, depending on whether the context is habitat, morphology, behaviour or ideology.

(a) Variation by linguistic and social context

Little will be said here on variation according to linguistic context, since its ubiquity has already been the subject of much discussion [Whiteley,

1966]. Some examples from the Nuaulu corpus include the use of uninomials and polynomials for the same taxon, depending on whether the identity of the animal is understood, and variable substitution of terms in a class-inclusive relationship. Thus, in the first case, it is in order to speak of **imasasae** (the gecko) when what is actually meant is **imasasae numa** ('the house gecko, *Hemidactylus frenatus*). An example of the second case is that while in one elicitory context it may be appropriate to speak of **kasa'un** (*Calotes cristatellus*) as a type of **hohone**, in another it may be equally in order to talk of **hohone** (*Draco lineatus*, the 'flying lizard') as a type of **kasa'un** [chapter 3.5; also Ellen *et al.*, 1976a]. Such variable practices appear to derive from the priority or frequency of particular terms in a stretch of discourse. If a conversation opens with a discussion of (or reference to) **hohone**, then **kasa'un** is a type of **hohone**; and vice versa. This usage has also been observed for **isa** (*Hydrosaurus amboinensis*) and **puo** (*Varanus indicus*, the water monitor); **nopa hanaie** (*Eugongylus rufuscens*) and **nopa inae** (*Tiliqua gigas*); and **poro-poro** (tree frogs) and **notu** (ground frogs).

I have presented extended examples of classificatory flexibility according to social context elsewhere [Ellen, 1975a], but variation according to ritual, general conversation and economic activities is important generally. Variation according to differing ecological and economic contexts is considered below. Here I shall confine my remarks to one context where classifications associated with it often tend to be at considerable variance with those derived from other principles.

Classification by mythic origin, in particular, may conflict strikingly with those apparently based on a polythetic combination of morphological, behavioural and ecological features, although, to some extent, mythic knowledge may be absorbed into such classifications. For example, mythically, many lizards are ontogenetically close to snakes. Most skinks (and possibly also dragon lizards, geckos and monitors) are said to derive from the reticulated python. In addition, the term **nanate** (death adder) may also be used more broadly to include the skinks *Tiliqua gigas* and *Eugongylus rufescens*, grouping together reptiles for which there is a marked aversion. However, in terms of other criteria, snakes are quite separate from lizards. They are distinguished by the shape of the head, the tongue, the length and shape of the body and (perhaps most importantly) leglessness. The importance of such morphological criteria is indicated in table 5.2 by the infrequency with which snakes were grouped with other animals.

Table 5.2. *Results of a test in which 25 informants were asked to sort picture cards of reptiles and amphibians into 'natural' groups based on degree of similarity*

	notu, ground frogs	**poro-poro**, tree frogs	**peku**, Amboinan box terrapin	**enu ikae**, leatherback turtle	**puha**, crocodile	**imasasae**, geckos	**kasa'un**, *Calotes cristatellus*	**isa**, *Hydrosaurus amboinensis*	**puo**, monitor lizard	**poso**, skinks	**tekene**, snakes
1. **notu**	–										
2. **poro-poro**	25										
3. **peku**	2	2									
4. **enu ikae**	1	2	22								
5. **puha**	1	1	11	9							
6. **imasasae**	–	–	1	3	8						
7. **kasa'un**	1	1	1	2	1	8					
8. **isa**	1	1	2	4	15	17	5				
9. **puo**	1	1	2	4	12	20	5	23			
10. **poso**	1	1	1	2	9	21	5	15	18		
11. **tekene**	–	–	–	–	–	3	1	–	–	3	–

(b) Variation by ecological zone and subsistence technique

Some years ago, Malkin was able to show that the number of herpetological taxa recognised, utilised, and about which there was local knowledge, among the Cora, Sumu and Seri groups in Mexico and Nicaragua, varied with environmental and economic pattern. In particular, collectors tended to have a more extensive knowledge of wild fauna than agriculturalists [Malkin, 1958: 74–6, 89]. These data tend to confirm the hypothesis developed by Melville Herskovits, Eugene Nida and Harold Conklin, that the degree of elaboration of terminologies is positively related in a general fashion to 'cultural significance' [but see chapter 6.3 here and Hays, 1974: 143–4, 509–10]. We might therefore expect that within communities with varied means of subsistence and encompassing a range of ecological zones, knowledge would vary depending on the extent to which individuals participate in the various activities of extraction. Indeed, in his Ndumba work, Hays discovered less sharing than even he expected. One point to remember here though is that what is significant is the ability to recognise empirically species that are used for various purposes, so that elicitation through lists of words or categories is not necessarily a reliable guide [*ibid.*, pp. 317, 329].

Appropriation in different zones determines the frequency of encounter with various animals and their traces. Animals that are absent or rare in the Nuaulu area are usually unlikely to feature in classifications or only appear peripherally and inconsistently. Informants are less likely to agree on the identification and classification of such animals. Similarly, if animals are present in the general site-catchment area but in specific habitats seldom frequented by the Nuaulu, this might also affect their classificatory status. Further, Nuaulu hunters or collectors may frequent such habitats but have little economic or other cultural use for the species found in it.

It is possible to isolate a number of reasonably distinct ecological zones within the Nuaulu extractive area (chapter 1.3): deep sea, inshore, beach, village, gardens and groves, lowland forest, swamp forest, upland forest and freshwater. Knowledge of the fauna of these zones varies according to age, gender, status and ability, as already described; for example, the various determinants and constraints surrounding knowledge of marine life-forms.

The experiences of different individuals in various habitats gives rise to inventories emphasising different things. From lists of fauna for particular zones, and by noting the overlap in species content, it is possible to determine the extent to which a person's knowledge of a particular

habitat is an aid to acquiring a more general knowledge of the fauna. The Rohua headman's acquaintance with salt-water fauna is of no help in identifying highland forest species, but the average hunter's knowledge of lowland forest species means that he will *ipso facto* know much of what there is to know of highland forest fauna.

(c) Variation due to classificatory features used

Contextual variation may also depend on the features available to classify animals: habitat, morphology, behaviour (including such things as vocalisation, means of locomotion, eating habits, smell and posture), utility and ideological position. It is clear that these represent highly dependent variables. Ideology and habitat have already been considered to some extent, while morphology and behaviour will be looked at also in the next section. But it is clear that for whatever reasons particular criteria may be used, the ones that are used may affect the kind of classification that emerges. Ecological criteria may result in crustacea and catfish being lumped together, behavioural criteria might bring together dragonflies and honey-eaters, and ideology may join cassowaries and cockatoos.

Morphology is perhaps the most common criterion, but even here variations may occur between the particular types of physical characters selected. Moreover, things such as size, shape and colour are all relative, and are therefore highly variable [Bulmer and Tyler 1968: 354]. In fact, morphology is often not enough. In the case of disputed identifications, information is usually required on the precise location from which specimens are obtained.

As far as reptiles and amphibians are concerned, in most mundane contexts morphology appears to be the single most important criterion involved in distinguishing between less inclusive categories. A card-sorting test applied to 25 Nuaulu informants indicated greatest agreement among informants for forms that were morphologically closest, in both a folk and a phylogenetic sense. Informants were presented with cards representing animals with which they might reasonably be expected to be familiar. After ensuring that they recognised each of the animals, they were asked to sort the cards into 'natural' groups based on degree of similarity. The criteria used were left entirely to the discretion of the informant. Thus, in table 5.2, the highest scores were recorded for the pairs **notu** (ground frogs)–**poro-poro** (tree frogs), **enu ikae** (leatherback turtle)–**peku** (amboinan box terrapin), and **puo** (monitors)–**isa** (*Hydrosaurus amboinensis*). Discrepancies between the folk and Linnaean schemes of things creep in with the next highest scores: **puo-imasasae** (geckos), **poso**

(skinks)–**puo**, and **isa–puha** (crocodile), but there is a good morphological fit between the pairs.

The details presented in table 5.2 are part of the more extensive analysis involving a wider range of taxa already discussed in general terms in chapter 4. No claim is made for their statistical significance (they are drawn from approximately 16 per cent of the population), and there has been no attempt to indicate different criteria involved in group allocation. This is so except insofar as such criteria are apparent from such results. The aim here is simply to suggest a means of representing statistical variation in the views of informants on the similarities and differences between categories.

5.7 Variability in the properties of different kinds of natural entity

Informants appear to be better at identifying some groups than others, whether these are defined phylogenetically, ecologically or culturally. We have already seen that this may be related to the opportunity and ability of various individuals and groups within Nuaulu society. Thus, women have a greater knowledge of freshwater fish, shellfish and all creatures of the tidal rockpools because fishing and collecting along the littoral and inland waterways is pre-eminently female work. Similarly, adult men have a far better knowledge of mature forest fauna than women, due to the opportunities provided by hunting and trapping. However, some variation must be attributed to the objective characteristics of the animals themselves, rather than to their utilitarian values or variation between types of informant. Animals with a distinctive behaviour or morphology (and perhaps also greater size) will tend to be discriminated positively and elaborated more in classifications than those that are undistinctive in these respects. Population size and any harmful effects they may have on humans and on natural species of value to humans may also be important.[2] For example, Nuaulu informants as a whole (and women in particular) were much more consistent and able in identifying molluscs [Ellen, 1992: table 10.2] than many other animals. The reasons for his seem to be that:

1 diagnostic characteristics are almost entirely morphological and do not change in the live or dead states or in different contexts, including cooking;
2 they are easily preserved over long periods; and
3 there are a lot of them around (in the rivers, in the houses, on middens), so that informants have opportunities to make more

Table 5.3 *Marine shellfish gathered by two females of different ages on a single collecting trip, 16 November 1970 (09.15–12.30 hours)*

	Aharena Nepane (11 years)	Harima Sonawe (30–35 years)
Conus spp.	0	3
Trochus tenebrica	11	11
Trochus niloticus	0	1
Turbo coronatus	2	55
Turbo spp.	2	8
Drupa spp.	4	3
Cypraea spp.	11	56
Pisania sp. c.f. *crenilabrum*	2	0
Tridacna maxima	0	1
unidentified	0	29
Totals	32	167

frequent identifications than for most other animal groups. Any one collecting trip may result in hundreds of specimens (table 5.3), and even young girls learn early to distinguish between forms on the basis of small differences in the shells.

The less common the animal, the more peripheral the position in a category, the less informants agree on its identification or classification [Gal, 1973: 206]. So, it is possible that the Nuaulu are so much better at identifying reptiles than frogs because there is a greater *morphological* diversity among the former. Their apparent failure as amphibian biologists stems in part from social, economic and ecological factors (see above) but also from the fact that specific (and even generic) differences are more finely distinguished phylogenetically – subtle variation in colour, distinctiveness of tympanum, behaviour and so on. Many of the creatures are even difficult for professional herpetologists to identify at this level, if superficial morphological characteristics alone are taken into account. In view of this, it is not surprising that the Nuaulu have difficulty.

5.8 Genuine variation or methodological indeterminacy?

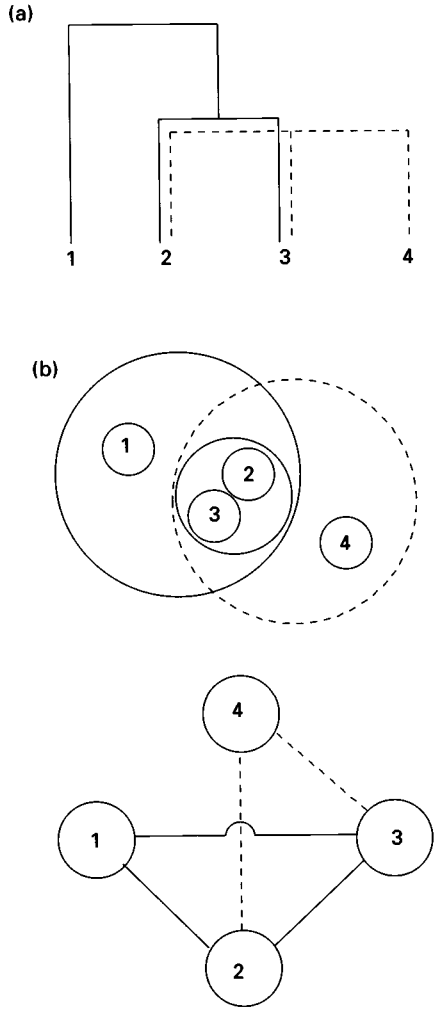
One difficulty which very rapidly emerges in empirical research on classifications is the extent to which conflicting information is to be interpreted as significant variation rather than carelessness or oversight on the part of the ethnographer or weaknesses in the techniques employed. Synonyms may be treated as separate categories, and names from different micro-

dialects (even languages) may be lumped together [Heider, 1969]. In test situations, use of preserved specimens or pictures rather than live animals may affect the outcome. The importance of careful work, therefore, cannot be over-stressed. Because he or she is an outsider, and because his or her knowledge of the language is inevitably limited, the ethnographer may tend to simplify, to formalise or play down variation where this is unwarranted. On the other hand it may be given undue emphasis. No doubt these things are always a source of error [Bulmer, 1969; Ellen, 1975a: 218–9], but how do we go about ascertaining the extent of such error [Bricker, 1974: 69–70]?

Much error of this kind stems from the difficulty of determining truly *individual* variation under fieldwork conditions. On the one hand, it is generally impossible to achieve experimental standards comparable to those expected in psychological testing carried out under laboratory conditions. On the other hand, it might be argued that attempts to emulate such procedures introduce yet other artifacts which distort results. The partial knowledge on which ethnobiological inventories are based is often that of small groups rather than individuals. It is important to question the very value of looking at *individual* variation when, in the real world, many decisions regarding identification and classification are arrived at collectively. And we might well ask what purpose is served by keeping informants ignorant of each others' performance [contra Hays, 1976: 496]? The collectivity is not 'the society' but much smaller groups of individuals, the composition of which is constantly changing (but where decisions are affected by the range of determinants already discussed). Answers given by any one informant in a session may be influenced by the comments (or even the mere presence) of others. In fact, he or she may actively solicit the comments of others, and this may be accepted as the normal way of going about things. Which of the conflicting identifications given for a single specimen is accepted as definitive depends on the group of persons assembled. What is regarded as an 'error' is determined by what the ethnographer decides is the significant variation of interest, for even 'errors' can have rational explanations. They are also the inevitable logical result of attempts to construct composite 'folk models' of culture [Hays, 1974: 131].

Individuals themselves are rarely consistent in the statements they make in elicitory contexts. They may initially provide one name, or indeed several, reject them, and finally settle on something quite different. This is the identification which must normally be accepted as 'definitive', although it is possible that further observation, consideration or consul-

Figure 5.2 Alternative groupings for four Nuaulu reptile categories represented as a taxonomy, Venn diagram and network.



tation may lead the informant to change his or her mind again. The problem with work of this kind is that it requires definitive answers for analytical reasons, while it is known that the processes generating the answers are capricious.

Variability may also be an artifact of taxonomic method [Friedberg, 1968; Friedberg, 1970], or other modes of representation. If it is assumed that informants operate according to a rigorous logic of hierarchy and class inclusion in which transitivity is encoded, then 'variation' is

inevitable. Thus, although I have chosen to represent the relationships between Nuaulu categories for amphibians and reptiles through a series of taxonomic charts (for reasons of convenience and communicative effect), this has given rise to some representational difficulties. Relationships which might have been more simply and accurately represented in other ways have had to be illustrated as interlocking hierarchies suggesting deviant practice. An example of this is the relationship between the categories **puha** (crocodile), **hohone** (flying lizard), **puo** (monitor) and **isa** (*Hydrosaurus amboinensis*). As part of a simplified taxonomic chart, this might be represented as shown in figure 5.2a. Where taxonomies can be shown to be part of the classificatory equipment used by informants, then this must be evident from representations, but their use across the board reifies certain connections and variations while concealing others. One possible alternative, already mentioned, is the use of Venn diagrams. The relations portrayed in figure 5.2a would then look something like figure 5.2b. Another possibility is simply to represent the relationships as a network as in figure 5.2c. There is no reason to assume that classificatory space is two-dimensional, and there are good reasons to doubt it. Sometimes even three dimensions are insufficient to express complex relations between categories. All too frequently, elicited data are distorted through attempts to represent complex interlocking relationships in elegant diagrams which have height and breadth, but no depth.

5.9 Conjectures and inventions

There is considerable variation amongst the Nuaulu in the range and accuracy of individual and sub-group knowledge of animals, their names, and how these should be assigned to categories. Individuals vary in the experience of these groups due to social differentiation, context and, to some extent, because of the characteristics of the animals themselves. It is personal experience and the exchange of personal experiences that are important both at the level of identification and in much assignation of animals to more inclusive categories. The authority of tradition, socialisation, and the social distribution of power and of formal status may certainly affect allocations and arrangements, particularly at the more abstract level. In some cases, such forces may guarantee a single favoured pattern but, as a general rule, the framework has to be flexible enough to allow individuals to fit into it as much as possible of their unique experience [Bulmer *et al.*, 1975: 11].

Variability is what we must expect, diversity is part of the system; homogeneity is not only not necessary, or even possible [Hays, 1974: 204,

305], but perhaps is not always desirable. This is not only because people's knowledge, interests, and abilities in identification and classification vary, but also because people constantly use categories, without formally defining them, in ways which suggest different, even opposite, properties on different occasions [Bourdieu, 1977: 110]. Indeed, toleration of high variability in a group's behaviour may be a factor of considerable adaptive value. Decision-making for the Nuaulu is patently not an individual act [*contra* Hays, 1974: 24]. It is for this reason that I am as wary of the theoretical pre-eminence of the 'individual' as I am of the pre-eminence of 'culture'. It is, of course, individuals (not cultures) who perceive [Hays, 1974: 99], but they do so in a world where social interaction is continuous and determinate. The lexicon, the knowledge and classificatory construct of the individual can all too easily be reified through the careless use of the language of description and graphic representation. 'Mental maps', complex semantic models encased in the minds of informants, are just as improbable at the level of classification as are static and pictorial mental images at the level of identification. Undoubtedly, people do carry around constructs of some kind but, more importantly, they carry the ability constantly to recall, dissect and combine them according to changing exterior social and environmental stimuli and interior reflection. It is necessary to represent classifications and their variation in particular ways, for analytical and didactic purposes, but we only do so at the expense of understanding the full richness of the relations between classifying as a process, social practices in which these take place, and the classifications which are their products.

6

Social intrusions and cultural styles

6.1 Introduction

The contention that animal classifications are intrinsically social [e.g. Douglas, 1966; Leach, 1964; Tambiah, 1969], and which finds its immediate historical legitimation in the Durkheimian theory of knowledge [Durkheim and Mauss, 1963], has been strongly criticised by those persuaded by a more universalist–evolutionist position. These latter argue, in effect, that a type of classification exists which is, for all intents and purposes, independent of the rest of culture and society, conditioned primarily by objective features of the natural world and pan-human cognitive structures of the mind. Some [Hunn, 1977b: 61], in support of this, have noted that Durkheim and Mauss had themselves distinguished between 'technological' and social classification, the former being clearly distinguished from speculative beliefs linked to social structure. Such a distinction, of course, is an important article of faith, because if it were not so, many of the generalisations about the pan-human character of classification would be undermined. My own view, which has emerged and consolidated during the years in which I have been engaged in the Nuaulu research programme, is that no firm distinction between mundane and social can be sustained; that the place of certain animals in otherwise essentially mundane biological classifications cannot be explained purely in terms of appearance and behaviour, but must take account of cultural presentation and representation. Animals and plants, therefore, in this sense, can never be morally neutral; while it is inconceivable that classification might proceed in a way which, to use Geertz's felicitous phrase, 'externalises culture'. Moreover, systems of classification are not the inventions of individuals (in which case they would more closely reflect cognitive process), but arise through historical contingency, linguistic

constraints, metaphorical extension, ritual prohibitions and so on. Classifications are parts of belief systems, and as such are the productions of interactions, accretions, elaborations and condensations. Because of this they may have properties not identifiable in the thinking of particular individuals [Harris and Heelas, 1979: 23]. In short, the interconnections between cultural context and animal classification are more complex than was at first thought, and in this chapter I shall explore some of the more prominent linkages evident in the Nuaulu corpus.

There are numerous facets of Nuaulu animal classification which might be examined to demonstrate their embeddedness in social relations and cultural imponderabilia. Some of these have already been looked at, and throughout this book I have tried to stress and illustrate their significance. Thus in chapter 2 I show how the conceptual and metaphorical language of talking and thinking about animal relations is necessarily rooted in social experience, in chapter 4 how it is that the boundaries of more-inclusive groups are defined in terms of cultural particularities, and in chapter 5 how the degree to which Nuaulu tolerate variability and inconsistency in classifying and naming behaviour reflects the cultural importance of agreement; and the extent to which there are shared flexible responses depends on circumstances directly tied to the shared cultural demands of those circumstances. I deal here explicitly (though not exhaustively) with a number of issues which are not otherwise dealt with directly elsewhere, and which reinforce the point that while we may be able to isolate universal elements of cognitive process, regularities in the cultural artifacts to which they contribute – that is classifications and categories – are not established with the same confidence. These issues are the correspondence between Nuaulu categories and phylogenetic species, the extent to which classifications reflect day-to-day material concerns, species transformation, totemism, conceptual and representational similarities between animals and supernatural entities, symbolic dualism and anomaly.

6.2 Arbitrariness and correspondence

There has always been considerable interest in the extent to which folk categories and bio-taxonomic categories correspond. This is inevitably symptomatic of the quest for cultural universals on the one hand, and cultural relativity on the other. But this is territory where progress has often been hindered by a lack of hard zoological evidence. For, as Bulmer [1970: 1075] says:

Table 6.1. *Phylogenetic and Nuaulu inventories for amphibians, reptiles and terrestrial mammals known from Seram*

Taxonomic group	Genera	Species	Nuaulu primary categories	Nuaulu terminal categories	Differentiation
AMPHIBIA	5	8	6	7	−1
REPTILIA	27	32	12–13	33	0
CHELONIA	3	3	2	3	0
CROCODILIA	1	1	1	1	0
SAURIA	10	12	6	16	+3
SERPENTES	13	16	3–4	13	−2
MAMMALIA	20	24(22)	16	28(25)	+2(+1)
MARSUPIALIA	1	2	1	4	+10
INSECTIVORA	1	1	1	1	0
CHIROPTERA	9	11	1	9	−2
CARNIVORA	4(2)	4(2)	5(2)	5(2)	+2
ARTIODACTYLA	2	2	2	4	+10
PERISSODACTYLA	(1)	(1)	(1)	(1)	0
RODENTIA (murids)	2	3	3	4	+3

One cannot say of *any* taxon that 'it corresponds to species *x*' unless one knows of all other locally occurring species which could conceivably be identified or confused with *x*. And even if the investigator is aware of the local occurrence of certain species he may find it difficult or even impossible to observe these sufficiently frequently in the company of his informants, or to collect, for him to be able to be certain as to how they are classified.

Berlin, Breedlove and Raven [1966, 1973] and Bulmer [1974] first tried to measure degree of similarity, but it has been suggested that they systematically underestimated the degree to which folk and bio-taxonomic systems correspond. More recently Hunn, 1975c has noted that subgeneric taxa correspond poorly, but are disproportionately represented among terminal taxa. His [1975b] coefficient of dissimilarity marks a shift from a terminal category/species index to a generic/species index. Dwyer [Dwyer, 1976a: 430] criticises Hunn's use of a weighted and normalised coefficient of dissimilarity, as do I.

Table 6.1 presents information on Nuaulu inventories for amphibians, reptiles and land mammals, compared with the numbers of biological classes and orders. The first two columns of figures give the number of genera and species respectively recorded for the Nuaulu area during fieldwork. All mammals apparently to be found in the Nuaulu area at the present time have been included. Many have, of course, been introduced by humans and do not reflect the kind of discontinuities in species diversity generally of interest to zoologists concerned with problems of

dispersion and evolution. The numbers of ambiguously introduced animals are given in parentheses. For the purposes of establishing a contemporary indigenous inventory the list should include both endemic and introduced forms. While it may not represent the range of animals of interest to the evolutionary taxonomist, it is the operational reference group of concern to the local population.

The next two columns in table 6.1 contain the number of Nuaulu primary and terminal categories. Here again any error is likely to involve under-specification rather than over-specification. It might be argued, following my insistence on lumping both native and introduced species together, that the real inventory should include not only animals within the Nuaulu area, but those met with when travelling outside Seram (for example, monkeys), those known to the Nuaulu but never seen (such as elephants and tigers) and even animals whose existence is only mythical. In a sense this is true. Indeed, in some cases it is quite artificial to separate out some animals from spirits, which are perceived as a single continuum of beings (see section 6.6). While recognising this, I have purposely limited the present exercise to the relationship between the local fauna defined scientifically and the indigenous terminology which is broadly equivalent to it.

The final column of table 6.1 consists of an index of differentiation, as an indicator of the relationship between the number of biological species in the area and the number of Nuaulu terminal categories. The index is obtained by dividing the number of indigenous terminal categories by the number of species equivalents. The result is then expressed in tenths as + or − 1. For example, the ratio 16:13 (snakes) = 0.8 = −2, or the ratio 12:16 (lizards) = 1.33 = +3. Figures greater than +5 or less than −5 are regarded as significantly over- or under-differentiated.

Now, it is important not to claim too much for this index. It is simply adopted as a convenient and succinct means of expressing folk differentiation of the biological world. It must be acknowledged, for example, that being dependent on a single ratio it takes no account of the number of categories and species involved. Thus, the ratio 1:2 can have the same value as 100:200. While the latter is very likely to represent consistent over-differentiation of some significance, the same index for the former ratio might be accounted for very easily by individual informant variation and error, or even error on the part of the ethnographer. Clearly, the implications of the index with respect to larger groups are generally more significant than for groups involving only one or two species. It is therefore of some importance to bear such points in mind, not to draw

hasty conclusions from misleading arithmetic, and to treat the index with the caution it deserves.

Accepting all that has just been said, the Nuaulu appear to under-differentiate three groups – amphibians, snakes and bats – and then only slightly (−1, −2 and −2 respectively). Four groups – turtles, crocodiles, insectivores and perissodactyls – have values of zero indicating a general reflection of biological diversity in terms of local names, but the last three of these groups are represented by single species only – the crocodile, the shrew *Suncus murinus* and the introduced horse. Five groups are over-differentiated: lizards, marsupials, carnivores, artiodactyls and rodents. Of these, marsupials and artiodactyls are significantly over-diffferentiated (+10), although it should be noted that both are represented by only two biological species. In terms of classes, amphibians are marginally under-differentiated, mammals are marginally over-differentiated and reptiles are close to zero. Of the vertebrate groups not included in table 6.1, it is quite obvious that birds are significantly under-differentiated, and fish markedly so. For invertebrates, computation is largely meaningless, since most groups are self-evidently grossly under-differentiated.

Approximately 46 per cent of terminal categories applied to amphibians and reptiles correspond to species. Such units tend to be 'natural' in a biological as well as logical sense [Bulmer and Tyler, 1968; Bulmer, 1970: 1072]. Generally speaking, the Nuaulu inventory for amphibians and reptiles reflects natural species diversity. More specifically, they appear to under-differentiate amphibians, if only slightly (−1). Of the seven categories, all except one (**poro-poro**) might be regarded as of 'low cultural significance'; five categories are actually marginally *over*-differentiated. Turtles and crocodiles have differentiation values of zero indicating a general reflection of biological diversity in terms of local names, although crocodiles are represented only by a single species. Lizards are over-differentiated (+3). Reptiles as a whole are close to zero, and generally with limited use values. This may be due to the fact that while most reptiles have little or no utilitarian value (except insofar as harmfulness may make them culturally significant), they are a diverse group.

Part of the variation in the values for these indices may be explained simply in terms of inadequate data, the conduct of fieldwork [Bulmer 1974: 86] and artifacts introduced by quantification. This is particularly the case where we are dealing with groups where the relations between biological species and local categories are derived from small numbers. Error of this kind may be involved in the case of Nuaulu rodents. With the other low figure groups we can be reasonably sure that both the number

of species and local categories reflect the true situation. This is because the biological record is sound, and because the animals involved are either introduced species or otherwise morphologically distinctive.

On the other hand, groups for which a discrepancy between the number of species in the Nuaulu area and Seram as a whole indicates that more species might be found (bats, lizards, snakes), might very well give rather different indices were they to be computed using revised figures based on a thorough and systematic collection of specimens. Having said this I think we can nevertheless conclude that the values for lizards and snakes indicate over-differentiation, while the remainder indicate a broad correlation between numbers of biological species and indigenous terminal categories.

Apart from that due to error and inadequate fieldwork, there is of course genuine deviation from zero values. This may be accounted for in a number of ways. In the case of marsupials it is simply due to the fact that the named terminal categories represent two sexually dimorphic cuscus species (*Phalanger orientalis* and *P. maculatus*). Cuscus are important both economically and ritually and thus over-differentiation is consonant with their utility. Moreover, one sex of one species (*P. orientalis*) is employed totemically and is therefore prohibited food for certain clans. The fourfold classification and selection of only one category for totemic purposes may in this instance be in part a response to apparently contradictory (although related) values attached to a single genus: subsistence utility versus symbolic usage [Ellen, 1972: 226.7; Ellen, 1975a: 203–11].

Lizards, however, are also over-differentiated and these are of no particular utilitarian value. I would suggest that here the answer would appear to lie rather with the fact that while the group is diverse lizards have no immediate social values which would require them to be differentiated accurately and extensively, except perhaps for the purpose of separating dangerous from harmless types. The proliferation of terms may in part be related to an absence of consensus over how they are to be applied. Taking into account the possibility of error and the introduction of extraneous variables we can more or less conclude that the values for lizards indicate over-differentiation, while that for amphibians indicates a broad correlation between numbers of biological species and indigenous terminal categories.

As we progress to more inclusive categories, the degree of correspondence between Linnaean and Nuaulu categories diminishes. Although there may be recognition of very large categories which are still 'natural' categories in the sense that they contrast with each other in more than

just a few directions, these do tend in some cases to become 'distorted (partially dismembered and regrouped) in ways which give primacy to a limited number of characters endowed with high cultural significance' [Bulmer, 1974a: 13). **Notu** provides an example of an undistorted more-inclusive category, **tekene** an example of one that has been considerably distorted. There is no Nuaulu term for 'reptile', and we would not expect one for 'amphibians' as opposed to 'frogs'. Neither are there terms for these groups combined or a covert grouping of any kind more inclusive than the biological order. The most inclusive categories are **poso** (in the sense that it refers to all SAURIA and CROCODILIA), **notu** (in the sense that it refers to all frogs) and **tekene** (in the sense that it refers to all SERPENTES). There are overlaps between these categories and those for fish and invertebrates, though not mammals or birds. Such inclusive usages are seldom necessary, except when under pressure from a persistent ethnographer, and serve no obviously pragmatic purpose in Nuaulu life.

It seems that what might be associated with utility more than the simple proliferation of names in a given domain is the consistency and accuracy with which these are applied. In the Nuaulu case labels are available and applied to reptile and snake taxa simply to identify them, but within reasonable limits the accuracy of the identification in a conventional biological sense is not important. The terms are used as loose labels to attach to animals with which people are interacting daily but peripherally in an economic sense, such as polymorphic skinks and to a lesser extent frogs. They are used to describe individual animals rather than to identify folk species with recognisable and discrete boundaries. The terms are sometimes used relatively, as in A is to B (labels) as x is to y (observed animal), rather than A = x and B = y. What may be labelled **poso noha kunie** ('yellow skink', usually *Mabuya multifasciata*) in contrast to another labelled **poso ai totu kopue** ('rotting tree leaf skink', usually *Carlia fusca*) may in contrast to a lighter coloured individual of *M. multifasciata* be spoken of as **poso noha metene** ('black skink'). In this sense we are not so much dealing with equivalences as relationships. This kind of relative identification is valuable quite simply because it brings order to an otherwise apparently chaotic faunal universe. Its immediate aim is the creation of cultural system in nature so as to comprehend it, rather than because the elements involved have direct social values, something which is no less true of western taxonomic science.

Another source of proliferation in terms for marsupials, lizards and snakes is in partial or imperfect synonymy. It could be argued that this is

involved in the kinds of discriminations just described, since there is an overlap in the application of terms for particular animals. If **poso noha kunie** and **poso noha metene** are both used to refer to *M. multifasciata*, and if in different contexts the same label might be applied to the same individual, then the terms are being used synonymously. This is despite the fact that the semantic overlap is only partial and that in other contexts they may be contrasted. In perfect synonymy – which (as I have already mentioned) has been rejected as a source of further names in the tabulated lists – terms are identical in sense and usage and are consistently applied to a single category. There are a number of synonyms applied to different kinds of cuscus, but these are not perfect since they are making classificatory discriminations not made by the normatively applied term. Thus, **mara kokowe** of an intermediate hue are sometimes labelled **mara makioi**, referring to their mixed (reddish-brown, yellow-brown) coloration. Sometimes animals of indeterminate taxa are labelled provisionally as **mara putie** or **mara metene**, referring respectively to specimens of a white or darkish hue, while members of **mara kokowe** and **mara siha** showing a rufous suffusion (typical of the breeding season) are sometimes termed **mara hehue**. But these terms, like distinctions such as **mara koko putie/ mara koko msinae** or terms applied to different phases of development, are not acting as synonyms so much as descriptions of variant individuals. They certainly cannot be granted the status of terminal categories. With snakes and lizards the situation is not as clear cut. Here both perfect and imperfect synonymy exist, but to complicate matters terms which may be applied to the same biological species on different occasions act as if they were true terminal categories. It is therefore difficult to distinguish the perceived synonymy of the informant from the objective synonymy of the observer.

While it is quite possible to list Nuaulu terminal categories for lizards and snakes and match them against their equivalent or near-equivalent biological species, it is equally instructive from the point of view of understanding the mechanism of classification to see names for animals as a pool of terms associated with certain ideal characteristics which can be matched against the diversity of reptilian fauna as and when it seems appropriate. Since nature is ultimately a punctuated continuity made absolutely discontinuous by taxonomic science on the basis of certain selected criteria, it makes no difference whether the discontinuous elements are greater or less than the biologically distinguished number. Thus for the Nuaulu it makes little difference whether the distinctions between terminal categories are based on mating popu-

lations or more superficial and loose criteria such as relative colour or size.

There is also an artifact in combining Nuaulu and biological categories which may explain the apparent over-differentiation of some groups. This is that the differentiation index for an order or class may simply be a reflection of significant over-differentiation in one of its component lower taxa, while other taxa within the order may have near-zero values or even be under-differentiated. For example, it is the significant over-differentiation of snakes and lizards which affects the overall picture for reptiles.

Among snakes some groups are under-differentiated, such as worm snakes, which are collectively termed **teke tuamana** and are not further sub-divided. As to explaining the over-differentiation, in at least one case it is due to the representation of two developmental phases of the same snake, *Dendrelaphis pictus*, as different terminal categories. This is not because Nuaulu are insufficiently perceptive to recognise that, in this case, **teke tam niane** is simply an immature **teke soata**, but because in terms of the criteria adopted for segregating terminal categories the former actually does change into the latter. Freshwater and marine snakes are probably over-differentiated on the grounds that they represent secondary food sources, although turtles, pythons and monitors are also important foods but have zero value. Here intraspecific variation may be less than among the water snakes. Among lizards, both *Varanus indicus* and *Hydrosaurus amboinensis* are sexually dimorphic, and this is recognized by the existence of four terminal categories for each of these two species which are both related in Nuaulu classificatory and mythic thought. The same is true for *Riopa (Eugongylus) rufescens* (**nopa hanae**, **nopa ina**). Other over-differentiation in these two groups can be explained by proliferation of terms applied to species commonly seen around the village and gardens. Under-differentiation is found for unknown and important species in areas distant from settlement locations, rare species being lumped together in a common category or incorporated in a category in which the type of species is relatively common. As the proportion of species present in inhabited and frequently visited areas is high compared with less frequently visited areas the index is pushed correspondingly higher.

It is clear from my data that on the whole the restricted fauna of Seram is reflected in concomitantly limited Nuaulu inventories for the classification of animals, for the vertebrate groups considered. Although we have by now disposed of the naive assumption of the equivalence of zoological species and folk categories [Bulmer *et al.*, 1975: 24], *in general*

the overall structure of local classifications for vertebrates among subsistence hunters, collectors, fishers and cultivators reflects actual species diversity (the number and objective distinctiveness of biological species) and groupings of species, and the relative frequency of their occurrence in the geographical region of the users of the classification [Bulmer, 1978: 14, c.f. Geoghegan, 1976]. In other words, it seems to confirm the view that what is in the end at stake is the very propensity and impetus of the human mind to classify forms at all [Bulmer *et al.*, 1975: 12–3; Lévi-Strauss, 1966: 9]. In particular, the Nuaulu data seem to imply that restricted faunas *naturally* limit ethnozoological inventories. The fewer the biological species, the shorter the inventories.

6.3 Classifying in pragmatic contexts

I have already noted that a weakness of many existing ethnozoological studies is that they ignore the particular empirical contexts in which classificatory knowledge is utilised, articulated and, indeed, generated; being content for the most part with abstract generalisations. With Hunn [Hunn, 1982: 831], I believe all folk classifications to be necessarily 'applied' and none truly theoretical. Any utterance concerning animals, whether in the context of general conversation, direct observation or examination of physical traces, depends upon and reinforces classificatory models, although it may do so partially and at a low degree of inclusivity, operating mainly between terminal and basic categories.

Now, on the face of it, this is a testable proposition. Indeed, in their influential paper 'Folk taxonomies and biological classification', Berlin, Breedlove and Raven [1966] set out to test it and seem to demonstrate a strong 'positive correlation between cultural significance and degree of lexical differentiation' [1969 (1966): 62] for the Tzeltal. This is in conformity with the Nida–Conklin hypothesis which states that the elaboration of terminologies (or portions of terminologies) is directly proportional to their cultural importance [Conklin, 1962: 132; see also; Frake, 1961: 121]. There are, however, both conceptual and practical difficulties when we come to undertake a similar exercise for the Nuaulu.

Most Nuaulu discourse regarding animals is in contexts of food-getting. In a four-month survey in 1970–71, 30.5 per cent by weight of consumed cooked meat was pork, 25 per cent fish of all kinds, 20 per cent cuscus, 12 per cent venison, 3.5 per cent shellfish and 3 per cent cassowary. Other species amounted to no more than 3.71 per cent. Thus, of all animal protein consumed, 46 per cent comprised of what the Nuaulu categorise as **peni**: pig, deer and cassowary [Ellen, 1978b: 70, 222–8]. It is

perhaps hardly surprising to claim, therefore, that such nutritional salience should affect the structure of the category, including contributing to the anomalous status of the cassowary. Similar material facts have a bearing on the classification of **marane** (cuscus), the only primary mammalian category which is further sub-divided into terminal categories.

But it would be a mistake to regard other non-food or non-material contexts as not being 'utilitarian'. We must remember, for example, that utility encompasses magical usages, since magic is a technique every bit as practical as setting a bird snare. Thus, the **kihoke** (*Lorius domicella*) is sacred for the clan Sonawe-ainakahata, though there is no prohibition on killing it in the normal way. Indeed, its wings are removed and used as a charm (**wai inte**) against ill health. Such bird-wing charms are seen frequently hanging in garden huts under a protective cover (**rine**). These and other animals may be chosen for spells, and therefore become salient, because in the context of the spell their *names* make sense, although it may also be the case that each type stands for any other [Rosaldo, 1972: 91]. Similarly, the meticulous attention paid by the Nuaulu to distinguishing varieties of **marane** is related to its role in four major rituals. The cuscus is an important symbol in Nuaulu thought, permeating a series of contexts which include hunting, head-hunting, fertility, clan-totemic associations and even the recollection of sexual exploits. Indeed, among males, to talk of hunting cuscus is an extended metaphor for the narration of sexual exploits. A more complex example is the category **teke patona** (*Python reticulatus*). In terms of nutritional and material utility this might be regarded as of moderate utility: it is eaten with some regularity (appearing towards the bottom of consumption charts compiled during fieldwork), while its skin has traditional technical uses and is exchanged with outsiders for trade goods. On the other hand it is also of considerable symbolic significance for those clans for whom it is a totem. In fact as a clan totem it is *proscribed* as food. Thus here symbolic importance is inversely correlated with its use by such clans as food. There are similar problems of assignation for many other Nuaulu amphibian, reptile and mammal categories; for example species recognised as of potential food or other material value, but which are nevertheless seldom collected.

Despite all this I am not at all convinced that one can demonstrate a consistent tendency either to over- or under-differentiate those segments of Nuaulu classifications which are symbolically important. Sometimes the relationship between over-differentiation and symbolic usage is clear, as in the case of the marsupial cuscus which I have described in detail

elsewhere. However, while the relationship is mutually self-enforcing there is no evidence that I know of to suggest that either symbolic usage encourages the making of greater discriminations among the animal species so used or that animal categories which are sub-divided naturally tend to be adopted as symbols. Rather, symbols arise for a variety of historical reasons which may or may not correspond to their contemporary function. Given the association between an animal and symbolic context, the possibilities for altering, refining or involuting the meaning of the symbol will be exploited. This may involve breaking down an animal category into further categories, or the glossing over of variation which in other contexts might be regarded as taxonomically significant. The former process is exemplified among the Nuaulu in the case of the cuscus [Ellen, 1972; Ellen, 1975a], the latter in the grouping of cassowary, pig and deer into a single category (chapter 4.4).

Another problem encountered in attempting to find significant measures of association between the differentiation of categories and their utility is in locating the degrees of classificatory inclusiveness at which such associations might hold. The Nida–Conklin hypothesis is usually expressed in relation to lexemes applied to terminal categories, but it is not simply the degree of extensiveness of the inventories which reflect cultural and social significance, but the shape of more inclusive categories and the overall *structure* of classifications. First of all, since in most cases terminal categories are incorporated within more inclusive categories, degree of differentiation at the terminal level will be reflected in the number and relationships (connections) between more inclusive categories. The almost allometric consequence of this is that we can speak of classificatory space varying in its density, where density refers not simply to number of terminal types, but to relations between all possible categories. Secondly, although ordinary speech in Nuaulu rarely involves big categories, and only rarely implies them, the more inclusive categories serve to store and arrange information about the less inclusive ones. Up to a point, how it does this is irrelevant: the important point is that it must be done. Thirdly, the division of fauna into useful categories leaves residual empty spaces often terminologically indicated by phrases such as 'just a bird', something that is not otherwise named collectively representing a 'non-resource' [Hunn, 1982: 10]. Fourthly, many other practical distinctions do involve the assumption of more inclusive categories, and it is such a requirement that moulds otherwise arbitrary arrangements in particular ways. Some of these requirements are as follows:

1. The need to define different types of environmental space. Here animals have an attributive function. You can recognise freshwater because it has a distinct aquatic fauna compared with brackish, sea or polluted waters; **nunu waene** as opposed to **nunu nuae**; or **lema** as opposed to **mate**. Sometimes these distinctions are evident in the lexemes for terminal categories (e.g. **nunu sesu waene**) or morphologically similar forms may be grouped together to indicate their common habitat (e.g. **nunu waene, nunu nuae**). Of course, space can be vertical as well as topographic.

2. To reinforce important divisions in social space, as between *village* and *forest* (e.g. **imasasae numa:imasasae ai atu**). Here, terms do not have to be in symmetrical oppositions, or marked terms imply the 'opposite' associated category. Obviously, 1 and 2 may overlap considerably.

3. To classify on the basis of potential food. Thus **peni**, although not referring to all 'meat'-bearing animals, does cover the most important, and for this reason is ritually embellished.

4. On the basis of fear, danger, disgust, or even familiarity and equanimity. Sometimes these are lexically encoded, sometimes it is simply the reputation of an entire group.

5. Restrictions on eating.

If we now return to the Nida–Conklin hypothesis we find that the Nuaulu data run contrary in a number of respects to what Berlin, Breedlove and Raven propose [Ellen, 1978a]. Thus, Berlin has suggested that large 'contrast sets' tend to be associated with categories of maximal cultural significance, but I follow Hunn [Hunn, 1975c] in finding that many Nuaulu primary categories refer to highly heterogeneous assortments of small animals of little cultural significance (see tables 4.1 and 6.4). Although there may be specific cases where cultural significance and large contrast sets are linked, they may equally reflect wide objective diversity among forms which are strikingly alike in terms of overall feature clusters, but which have little direct use value.

I am willing to concede that such problems may be accounted for in part in terms of the criteria adopted in assigning categories to cells in a matrix. From what I have said at length in 6.2 regarding the reasons for variation in the Nuaulu differentiation index, it will be evident that the possible cultural factors involved are considerable. Consequently I find it no easy task to rank terms according to a simple threefold classification of degree of 'cultural significance'. The authors of the article in question

appear to adopt material utility as an appropriate criterion (use values embodied in food, drugs, firewood and so on), and indeed this might work well for Tzeltal plant names. But when considering Nuaulu animal categories we cannot be so confident in our assignations.

Moreover, for a number of reasons – methodological, technical and ethnographic – it is (a) difficult to measure differentiation and, having measured it, (b) it is difficult to explain it simply. The broad categories used by Berlin, Breedlove and Raven take no account of degree of differentiation. Under-differentiation might involve from two to 20 (or more) biological species being represented by a single local category. The same is conversely true of over-differentiation. Thus, significant variation is not distinguished from that which might conceivably be due to errors on the part of both informant and ethnographer. Moreover, in view of the fact that names are not always applied consistently, it might be concluded that the task of measuring over- and under-differentiation with respect to biological species is an impossible one. Certainly, it would be difficult to produce neat tabulated data on categories applied to groups and divisions of species for the Nuaulu in the way that has been managed for the Tzeltal. Now all this might seem very straightforward and obvious except that it contradicts the Nida–Conklin hypothesis, as well as certain simplistic theories of the social construction of reality [Bulmer, 1970]; while lack of correspondence between species and folk categories, and in particular the tendency towards polytypy (the systematic internal diversity of plant and animal taxa), is subject to the influence of 'special purpose' cultural factors (salience, agricultural practices and so on) [Berlin *et al.*, 1966; Berlin, 1976; Geoghegan, 1976; Hunn, 1975c: 312]. It seems that the extensiveness of inventories reflects cultural significance in only a partial way, applying unevenly to different groups.

Specifically, it seems that discrepancies between scientific and indigenous inventories and classifications tend to increase as we progressively ascend taxonomic hierarchies. Even at the level of biological orders and below it is seldom possible to attribute proliferation and condensation to a single cause. At the generic level this is much less likely to be the case, as the various examples cited above indicate. Symbolic value, other semiotic usages (such as signs of seasonal change, omens and the like), material utility in its widest sense, natural specific and sub-specific diversity, frequency of encounter, morphology, distribution and population sizes of different species are all relevant factors which will affect the differentiation index either way. For example, over- and under-differentiation may equally reflect the degree of endemism of particular species or genera.

Endemism engenders both these processes by often being linked to an adaptive radiation of animals at the specific and sub-specific level. Where morphological differences between species are greater there is a higher probability that scientific and local categories will coincide. Moreover, proliferation of terms is not itself necessarily indicative of social value, nor paucity of its absence. Consistency in the application of terms to taxa may be as good an indicator as degree of differentiation, as may the structure of a classification (degrees of inclusiveness and other forms of complexity) and nomenclature, such as number of uninomials to binomials [Bulmer *et al.*, 1975: 22].

So, it is necessary to exercise caution when invoking the Nida–Conklin hypothesis. To say that classifications are 'practical' should not suggest that they are simply the sum of so many individual strategies for dealing with the material world, sufficient to meet all contingencies. Neither should we be narrow in our definition of utility, nor limit our measures of association to any one 'level' of categorical distinction, so as – for example – to consider only inventories of lexemes applied to terminal categories. All classifications of nameable categories (like their non-verbal counterparts) are essentially a means of apprehending and ordering nature, thus facilitating perception and the use of information about the environment so as to produce, reproduce and perpetuate the species. But the room for manoeuvre in such matters is constrained by what is cognitively possible, and the objective characteristics and diversity of the fauna itself.

6.4 The transformation of species

The belief found among many peoples that animals of one species can, under certain circumstances, change into animals of another species, is now well documented [e.g. Bulmer, 1968: 6.9–36; Bulmer and Menzies, 1972–3: 101–4; Dwyer, 1976a; Hunn, 1973: 288–9]. Such beliefs are puzzling since they often relate to common creatures and contrast sharply with empirical biological knowledge which is otherwise extremely accurate. They are additionally important because, if people really believe them, then they might be thought to affect in rather fundamental ways how they classify the relationships between different animal categories.

Approached from a different angle these same beliefs are comparable to other well-known folk assertions which appear to us as false, such as the Nuer claims that twins are birds and cucumbers oxen. The recent literature on these and related issues is extensive, much of it impinging on a heavyweight discussion of 'rationality' and 'relativism' [see, for

Table 6.2. *Some Nuaulu beliefs in species transformation*

A. MYTHIC TRANSFORMATION			
i. Totemic			
1. human		>	**mara makinete** *Phalanger maculatus chrysorrhous* spotted cuscus
2. **puha** *Crocodylus porosus* esturine crocodile		>	human
3. **asu** *Canis familiaris* domesticated dog		>	**puo** *Varanus indicus* monitor lizard
4. **teke patona** *Python reticulatus* reticulated python		>	human
ii. Partial bilateral transformations			
5. **sopite** *Rhyticeros plicatus ruficollis* Papuan hornbill		< >	**asuwan** *Casuarius casuarius* double-wattled cassowary
6. **asu** *Canis familiaris* domesticated dog		< >	**maianane** *Cervus timorensis moluccensis* Moluccan deer
iii. From plants and other objects			
7. **hatu takanasi** type of naturally-occurring standing stone		< >	**(nusi) takanasi** *Pandion haliaetus* osprey
8. **hatane** *Metroxylon*, genus of sago palms		>	**poro-poro** *Litoria infrafrenata* large green tree frog
B. NON-MYTHIC TRANSFORMATIONS			
9. **mumne** larvae of various species of *Drosophila*, fruit flies		>	**susue** intestinal nematodes
10. **sohane** intestinal nematodes		>	**nikonake** tapeworms of the genus *Taenia*
11. **notu anae** *Litoria* sp. (*bicolor* group), Pelodryadid frog		>	**notu** various species of frog most commonly *Rana* sp. but also *Rana modesta*, *Litoria* sp., *Litoria amboinensis*, *Phrynomantis fusca* and others
12. **notu** various species of frog, most commonly *Rana* sp. but also *Rana modesta*, *Litoria* sp., *Litoria amboinensis*, *Phrynomantis fusca* and others		>	**notu anae** *Litoria* sp. (*bicolor* group), Pelodryadid frog
13. **notu** (see above)		>	**kako** the microhylid frog *Phrynomantis fusca*
14. **poro-poro** *Litoria infrafrenata*, large green tree frog		>	**inararai** *Litoria amboinensis*, Pelodryadid frog
15. **puo** *Varanus indicus*, water monitor lizard		>	**imasasae ai ukune** *Gekko vittatus*, type of gecko

Table 6.2 (*cont.*)

16. **tekene** general term applied to most snakes and certain other superficially similar creatures; the term is used here in its narrow sense	>	**kasa'un** *Calotes cristatellus*, agamid (or dragon) lizard
17. **teke patona** *Python reticulatus*, reticulated python	>	**nopa ina** *Tiliqua gigas*, type of skink
	>	**poso** general term for skinks, lizards of the family Scincidae
	>	**niniane** general term for centipedes, usually of the genus *Scolopendra*
18. **enu** general term for sea turtles	>	**peku** *Cuora amboinensis*, Amboinan box terrapin
19. **kumake** hermit crabs	>	**katanopu sipu-sipu** *Birgus latro*, coconut crab

example, Hollis and Lukes (eds), 1982]. It might be said that in the folk-biological cases the examples are 'literal', while in these latter they are 'metaphorical'. However, this distinction is crude and pernicious. It is crude because we now realise that all languages have tropological qualities regardless of domain [e.g. Sacks (ed.), 1979], and that it is the kind of trope which varies, and then generally as a matter of degree [c.f. Crick, 1976: 159]. The distinction is pernicious because it perpetuates the separation of semantic fields which should be analysed together, underscoring an erroneous distinction between technical and ritual spheres which we have inherited from Durkheim and Mauss; and because it perpetuates separate analytical and theoretical traditions, often hostile by convention and stressing apparently mutually contradictory features of classifying behaviour [Ellen, 1979a]. In looking at Nuaulu examples of such beliefs I try to cast the analytical net somewhat wider than has hitherto been the case, by looking at other related statements which also appear to be empirically false, but which have (to the best of my knowledge) been generally considered independently.

Table 6.2 lists all cases that I have on record of Nuaulu belief in transformations between different species of non-human animals, though not all of those involving humans and other animals. These may be divided into mythic and non-mythic transformations, that is those that are represented as pseudo-evolutionary and historical events, and those that are represented as statements about the contemporaneous developmental biology of living animals. Of mythic transformations (A), some

involve unilateral transformations between humans (or their surrogates, such as named domestic dogs) and animals. The transformation may be either human to animal (as in human > spotted cuscus) or animal to human (as in reticulate python > human). All such unilateral transformations involve totemic animals, that is those animals which (in this case) serve as emblems for particular Nuaulu clans, and respect for which is linked to various kinds of avoidance practices (see below). Other mythic animal transformations are bilateral, involving the exchange of various morphological features or some item of behaviour. Thus, the cassowary exchanges large wings and the power of flight with the hornbill for small wings and flightlessness [Ellen, 1975a: 214]. A raw deal, it would seem, for the cassowary. Additionally, there are mythic beliefs in the emergence of animals from inanimate objects, such as **poro-poro** (the large tree frog) from the sago palm. There are, of course, many stories of reverse transformations of particular animals into, to cite the commonest example, stones. The second group of transformations in table 6.2 (B) are definitely regarded by the Nuaulu as non-mythic, in that informants invariably maintain that such metamorphoses do not represent single, once-occurring, historical events, but are part of a continuing biological reality.

How then to explain such curious beliefs? To begin with, it may be necessary to repeat that these are emphatically not simply errors arising from the objective difficulties of observation, neither does it mean that the Nuaulu are not perfectly well aware that most of the species are also capable of breeding true, after their kind. It is perhaps also worth stressing that not all Nuaulu agree about the authenticity of these claims. On the other hand it is clearly true that in some cases (especially those involving frogs and invertebrates) the opportunities for careful observation are limited and restricted for technical reasons. It has become something of a cliché to extol the mastery by simple peoples of some *science du concret*. Now, this may arise from some exaggerated liberal or Rousseauesque respect for the intelligence of our informants, it may be an article of relativistic faith or the synthesized results of substantial empirical and experimental research. But whatever it might be, I do not think that it should prevent us from admitting that sometimes our informants get things wrong. After all, the Dutch naturalist G. E. Rumphius, describing the biota of Amboina in the late seventeenth century, found no difficulty in accepting the native belief that the leathery leaves of the mangrove (*Sonneratia caseolaris*) changed into small fishes when hanging in water [Liber IV, 113; see also de Beaufort, 1959: 58]; he also found it exceedingly difficult to reject the possibility of spontaneous generation of living matter.

The reason why both Rumphius and the Nuaulu see fit to invoke beliefs of this kind, is because in the absence of complete empirical proof – the onus being, in good Popperian terms, on *falsification* – the belief is sustained, moulded and crystallized by the knowledge that many animal forms undeniably *do* (visibly) metamorphose into very dissimilar beings (tadpoles > frogs, caterpillars > butterflies, and so on). It seems that this conceptual shift and difference does not find linguistic and (or) cognitive expression in all cultures, or at least may be represented only partially and with unfamiliar semantic linkages. In this context the existence of other, less easily demonstrable, transformations, appears as a very reasonable empirical possibility. This is especially so when sustained by a metaphysics which reflects social and other forces [Bulmer, 1968: 621].

It has been suggested [Dwyer, 1976a] that such beliefs are maintained (at least amongst the Rofaifo of the eastern highlands of Papua New Guinea) by casuistry designed (as it were) to offset dietary regulations. Most of the Nuaulu non-mythic transformations certainly share a great deal in common behaviourally and morphologically, and this too helps uphold the belief in their ontogenetic relationship. But there are sharp and very obvious differences as well, as in the transformation between **tekene** (no legs) and **kasa'un**, **nopa ina** and **poso** (legs), that is between snakes and various kinds of lizards. In this case it might be thought that there are other resemblances, such as shared or overlapping habitat, common foods, similar resting places and comparably constructed nests [*ibid.*, 199]. Here again there is only a partial fit with the Nuaulu data, since to cite just two counter examples, **poro-poro** is an arboreal and **notu** a terrestrial anuran, while **enu** is a marine and **peku** a freshwater turtle. To claim, as Dwyer also does, that the transformations also reflect changing cultural and environmental status (as between abundance and scarcity, smaller and larger, lowland rainforest and non-rainforest, or terrestrial and arboreal) may be true in one sense, but such reflexes can be discovered for virtually any pair of animals, however closely related or randomly selected. And if they do mirror such transformations, what cultural purpose might this serve? Dwyer says that among the Rofaifo such transformations resolve the paradox that animals are constantly culled by humans and yet still survive [*ibid.*, 203]. This will not work for the Nuaulu for two reasons. Firstly, because for the hypothesis to be even remotely realistic culled species have to be those which *result* from transformations. Of all the animals regarded by the Nuaulu as involved in metamorphic relationships, the three most important in terms of food (the monitor, python and marine turtles) are only to be found as animals

which give rise to other animals. Moreover, of those animals which are seen as the products of transformations, only two species (**poro-poro** and **peku**) are regarded as being ordinarily edible, and these are only eaten rarely.

Such *ad hoc* explanations really do not seem very promising in relation to the Nuaulu data. If we are looking for broader and more acceptable explanations it is necessary to examine the linguistic and metaphorical expression of relationships between animals in general. Thus, the Nuaulu belief in transformations between frogs (all of which are perceived as being closely related morphologically, as natural kinds) is sustained by the overlapping languages of classification, and the language of ontogeny. The verbal root for 'to grow', **ruhu**, is unambiguous, and could only be applied to genuine beliefs in the continuing transformation between species. However, people also use the verbal root **hoka**, 'to come, to go out, to bring out' (to originate), or even **neni**, 'to change (into)' to express similar ideas. These are words which may express a geographical transition, a provenance, a historical or mythic origin, an ontogenetic *and* (metaphorically) a classificatory relationship. Thus we have statements such as:

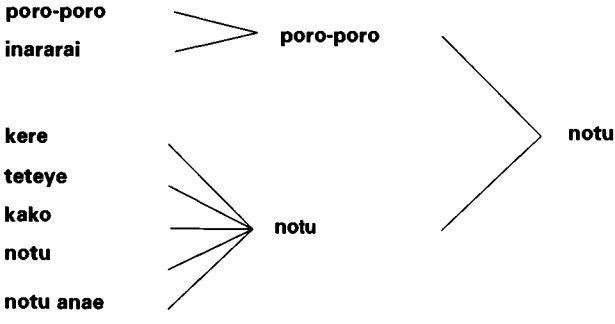
1. the younger one caused people to come out of rocks and trees, **ia mui i-hoka mansia rerihoni hatu run ai**
2. the clan Somori originates from the python, **ipa Somori ihoka yarihon teke patona**
3. the butterfly possesses a mother coming out from a caterpillar, **kori-kori nene inae rerehoni une-une**
4. the tree frog 'comes from' (is a kind of) **notu**, **poro-poro rehokai rerihoni notu**
5. this snake turned into a person (it-became-it with person), **ia tekene rei re-neni-ki tau mansia**
6. they say that we have come (originated) from Nunusaku, **sio o-asau ata ami a-hoka-ma on pan Nunsaku**

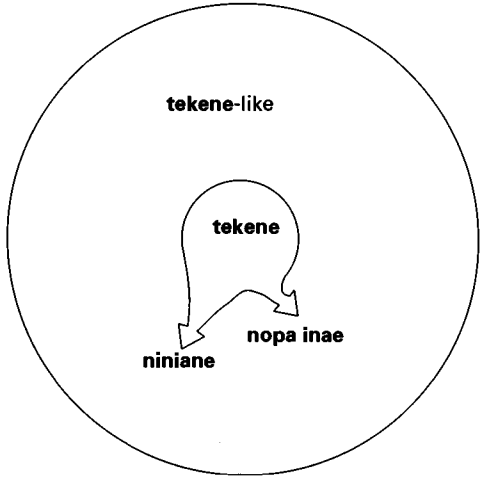
Thus the verbal roots **hoka** and **neni** may be used in a variety of ways to explain associations. Here, ontogeny, biological parenting, geographical transition, historical origin and classificatory similarity are all isomorphic expressions of relationship. In particular, in the fourth statement, the literal expression 'comes from' should perhaps be understood as 'comes from the category', that is, 'is a kind of'. In such a linguistic context the semantic shift from class inclusion to temporal (or indeed, spatial) origin is entirely understandable.

This metaphoric recapitulation of phylogeny through ontogeny (though Haeckel would hardly recognise it as such) is found not only in verbal expressions but in common adjectival qualifiers of specific animal types. Many Nuaulu terminal categories are, as we have already seen from chapter 2, labelled **anae** ('child of') or **inae** ('mother of') [c.f. Taylor, 1990: 73–9]. It has been suggested that often when such qualifiers repeatedly occur in the data of linguistically unsophisticated researchers they are likely not to be actual terms but the convenient fabrications of willing, but untutored, respondents. This is good general cautionary advice, but at the same time it is no good denying that in some languages (and Nuaulu is one of them), the terms *do* occur again and again as true names. Nevertheless, it must be said that in *no* case are **anae** or **inae** found together as a terminological opposition. Rather they seem to indicate marked terms in contrast to unmarked uninomials (e.g. **rikune**:**rikune anae** (terms applied to various different species of true bug), **notu** (various species of frog):**notu anae** (frog: *Litoria* sp.), **kinapuku** (the sago weevil, *Rhynochophorus bilineatus*):**kinapuku anae** (the rice weevil, *Calandra oryzae*), **kunte** (mosquito):**kunte inai** (crane-flies and the long-legged fly, *Nerius nigrofuscus*)); or in contrast to a binomial where the qualifier is not in obvious semantic contrast (e.g. **nopa hanae** (skink, *Eugongylus rufescens*):**nopa ina** (skink, *Tiliqua gigas*), **manu inae**:**man tulalakane** (female and male of *Gallus gallus*), **puo inae**:**puo pipane** (female and male of the monitor *Varanus indicus*), **isa inae**:**isa pipane** (male and female of *Hydrosaurus amboinensis*)). Here **inae** appears to be indicating a distinction on the basis of sex rather than matrifiliation. This, however, need not worry us since all **pina** ('women') become **inae** (at least in an ordered social universe), while all **hanae** ('men') are certainly the **anae** of someone. In cases where the marked binomial contrasts with a uninomial, the marked term may indicate simply a smaller animal, as in the **notu**, **rikune** and **kinapuku** examples cited above, or a larger species, as in **kunte**:**kunte inae.**[1] In the cases considered in the preceding paragraph we cannot necessarily infer that **anae** is believed to be the offspring of the **inae** form. It is rather a means of pressing similarity, a similarity which may in some respects *appear* to resemble a parent–offspring relationship, for example **anae** may be smaller (e.g. **notu anae**) or may be spatially related to the **inae** form in a way suggestive of 'offspringness'. It is my view that in certain cases this expression of similarity is elaborated into a belief about ontogeny or origin. It is, if you like, a quasi-evolutionary dogma, in that similarities are regarded as indicating kin relationship of some kind. Thus to say that **peku** may be derived from **enu** is to legitimate biologically, provide some

rational explanation for, the close similarity between turtles and terrapins. This should not surprise us, since totemism is precisely an example of this kind of thinking: thus a *classificatory* relationship between a natural species and a human group is legitimated by mythical transformation between the two. Similarly, the use of the term **notu** polysemously at several degrees of inclusiveness with respect to categories of frog suggests, in a very literal sense, a belief in 'family' resemblance (see upper part of figure 6.1). With **tekene** (snake) the situation is comparable, but here it additionally seems to resolve some classificatory anomalies created by the existence of peripheral creatures. Thus, through a belief in species

Figure 6.1 Two ways of representing 'family' resemblances in Nuaulu classification of animals.





metamorphosis, the status of the giant centipede and the skink **nopa inae** as **tekene** is mystically legitimated (lower part of figure 6.1). Similarly, **poro-poro** and **inararai** are those anurans least like the focal **notu**, while **kako** is peripheral in view of its vocal resemblance to a reptile. Thus, assertions of inter-species ontogeny may locally serve to confirm convenient classificatory relationships of otherwise ambiguous and marginal creatures. What is interesting is that this accommodation should be reached using a semantic repertoire of relationship terms common to diverse lexical fields of knowledge; the cosmographic as well as the narrowly technical. It is insufficient to say that 'the ritual', 'the metaphoric' or 'the social' *intrudes* upon the mundane, for what is undeniable is that classifying behaviour in both employs many identical linguistic and semantic conventions.

6.5 Totems, taboos and the mockery of animals

This is not the place to enter into a discussion of Nuaulu totemic beliefs as such. Such beliefs are simple, those natural species selected being regarded as **monne**, a term which is applied to any object, action, utterance or phenomenon which is sacred, and therefore (generally) tabooed. The totemic association may be with an individual or a clan, or be sex-linked within a clan. I shall confine myself here to clan animal totems, although certain restrictions may be placed on particular individuals, as is the case with **woku (karakaiya)**, the sawfish *Pristiopsis*. Each clan has many totems and related **monne** beliefs, only a fraction of which relate to animals. Some natural species are regarded as being more important than others, and in some cases it is possible to rank totemic emblems in a strict order of significance. In other cases this is not possible. Nuaulu animal totems are listed in table 6.3, according to clan and distinguished as either 'primary' or 'secondary'. Although the list is almost certainly incomplete, it is clear that:

(a) some clans have more animal totems than others;
(b) all clans have one animal or plant species which can be regarded in some sense as *primary*. We can identify these by their ritual prominence, by their being features in myths of origin, by the completeness of taboos surrounding them and by their graphic representation, for example on shields;
(c) in some clans there is a recognised rank order of totems, while in others this does not appear to be the case.

Given that different clans often have the same totemic species, and that in some cases primary totems are identical, the simple 'good to contrast'

Table 6.3. *Distribution of Nuaulu animal totems according to clan*

	Ma	Pe	Son-aip	Pi	Hu	Son-ain	Nu	Ne-tom	Ne-ne	Ka	Som	Sop
1. **puha** *Crocodylus porosus* esturine crocodile	a		a		b	b						
2. **hahu** *Sus scrofa* pig		b?[1]				b[1]						
3. **asuwan** *Casuarius casuarius* cassowary						b[2]						
4. **enu** all sea turtles		b						a				
5. **peku** *Cuora amboinensis* Amboinan box terrapin		b						a				
6. **puo** *Varanus indicus* monitor lizard		b						b				
7. **isa** *Hydrosaurus amboinensis* sail-tail lizard								b				
8. Snakes (generically)	b[3]	b						b		a	b	a
9. **teke patona** *Python reticulatus* Reticulate python								b			a	a
10. **teke panarine** *Boiga irregularis* Banded tree snake								b			a	
11. **mara makinete** male *Phalanger maculatus* spotted cuscus	b	b	a		a	a	a?	b	a		b	b
12. **notane** all bats				b								
13. **mara putie** young male *Phalanger orientalis*, cuscus							b					
14. **manue** *Gallus gallus* domesticated fowl	b	b				b	b	b[4]				
15. **kinoke** *Philemon sub-corniculatus* bald friar bird						b[5]						
16. **kihoke** *Lorius domicella* purple-naped lory						b		b				
17. **susi onate** imago of Anobid woodworm						b						
18. **nakatua** *Cacatua moluccensis* Moluccan cockatoo						b						
19. **puane** *Macropygia amboinensis* Amboina cuckoo dove						b						

Table 6.3 (*cont.*)

	Ma	Pe	Son-aip	Pi	Hu	Son-ain	Nu	Ne-tom	Ne-ne	Ka	Som	Sop
20. **ikae tuyo hutan** unidentified wrass						b						
21. **awane** *Anguilla bicolor* pacific freshwater eel				b								

Key. Clans: Ma = Matoke (Matoke-pina and Matoke hanaie), Pe = Penisa, Son-aip = Sonawe-aipura, Hu = Huni, Son-ain = Sonawe-ainakahata, Nu = Numanaeta, Ne-tom = Nepane-tomoien, Ne-ne = Nepane-nesinopu, Ka = Kamama, Som = Somori, Sop = Sopanani.
Totems: a = primary, b = secondary.
Notes: 1. spirit only; can be eaten. 2. spirit only; can be eaten. 3. Only clan head of Matoke forbidden to eat. 4. Includes eggs. 5. Feathers only?

explanation which we owe to Lévi-Strauss is inadequate. The irregularities seem to require special pleading.

Why then *are* particular animals (and plants) selected and, more especially, why are the same species repeatedly selected? In some cases we can provide quite specific historical hypotheses, such as that segmentary processes have left two new clans with the same primary totem [Ellen 1972: 227–8], as appears to be the case for **mara makinete**, the male *Phalanger maculatus*, with respect to Sonawe-ainakahata and Sonawe-aipura. But such an explanation is clearly only possible in certain cases, and where the evidence is not conclusive we are still left wondering why there has not been some realignment of totems to effect suitable symbolic contrast.

That the same animals turn up frequently suggests that certain species are particularly salient in Nuaulu thought. There is, what Bulmer has called, 'a pre-selected range' [Bulmer, 1978: 12], where each animal in the range is prominent when compared with all other animals, or in terms of others in a category (the largest, most brightly-coloured, most dangerous and so on). This would account for the preference accorded to the reticulated python (by far the largest snake) among snakes; and perhaps the esturine crocodile as the largest member of a covert LIZARD grouping, but it does not explain why the banded tree snake (**teke panarine**, *Boiga irregularis*) or **tekene** as an undifferentiated snake category should be found. It would appear to account for the selection of the male spotted cuscus (**mara makinete**, *Phalanger maculatus*), the Moluccan cockatoo (**nakatua**, *Cacatua moluccensis*), the cuckoo doves (**puane**, *Macropygia amboinensis*), the purple-naped lory (**kihoke**, *Lorius domicella*) and the bald friar bird, *Philemon sub-corniculatus* (**kinoke**), but why should the Nuaulu select sea turtles (**enu**), the Amboinan box terrapin (**peku**, *Cuora*

amboinensis) or bats in general (**notane**)? The first two in this second list (**enu** and **peku**) constitute a pair which closely resemble each other physically, but which are not terminologically related, while the third (**notane**) is a broad primary grouping containing many separate Nuaulu categories glossing numerous phylogenetic species. Here it is certainly salience which predisposes an animal to be selected, but not a narrow classificatory salience (the cognitive evaluation of the position of particular animals in particular categories), but rather that derived from overall cultural experience. Contrariwise, although totemic usages do not determine classificatory position, they may confirm and highlight certain classificatory relationships, such as **enu–peku**, or make the formal grouping of animals with similar characteristics less likely by stressing their individualities, for example crocodile (**puha**) versus monitor (**puo**) and sail tail lizard (**isa**).

On the other hand, utility is also only a partial explanation. I have argued in detail elsewhere [Ellen, 1975a] that *one* type of cuscus is selected as a totem to represent a culturally (including economically) significant genus, without threatening food supplies. This is done by recognising four types, only one of which is prohibited. It is therefore not surprising that within **marane** it is **mara makinete** which alone is of 'totemic' importance, for though the tenacity of life of the cuscus in general has been demonstrated [Ellen, 1972], it is the male of the species *Phalanger maculatus* which is noted for its enormous size and strength. It is also not surprising that it alone is specified in spells and invocations, addressed frequently (as a term of respect) as **kapitane mara makinete**. It is undeniable that the totemic and general ritual significance of **mara makinete** affects its contrasts with other **marane** categories, and therefore may be said to affect the structure of the classification. Similar casuistry is involved in the Sonawe-ainakahata use of the pig and cassowary as totems, where it is explicitly the spirit form of the animal which is totemic, leaving the flesh available for consumption. The only problem with reasoning of this kind is that it is plausible for more animals than it could conceivably apply to in fact.

I am convinced that totems are chosen for many different reasons. And being subject to historical contingency they are unlikely to be explicable in terms of an underlying governing logic of content, other than the drift towards symmetry which is a feature of all representational systems if the content is left unaltered, at least where non-literate modes are concerned. So-called *primary* totems (and other totems of high rank) tend to be multifaceted in their purpose and effects, combining properties of aver-

sion, food, size and classificatory salience, while those lesser totems may be chosen for one reason only (for example the **kihoke** for its bright feathers). Moreover, we have to turn the question on its head and ask why animals are *not* chosen, and this may be because many lack any properties which immediately generate salience in terms of a specific Nuaulu cultural repertoire. There remain many categories which would make excellent totems, were circumstances to conspire in their favour. Thus, omnivorous pigs eat dead humans and 'embody' in a very literal sense the souls or spirits of persons. Although the pig is indeed a secondary totem for one, perhaps two, clans, in classificatory terms pigs are no more significant than deer or cassowary.

Totemism, then, may affect animal classification by raising certain species to prominence, by serving to consign others to relative obscurity by down-grading them, and by shifting pragmatic attention to other less salient forms through restrictions attached to the more salient. Totemism also promotes lexical taboos, and consequently the prevalence of true synonymy. Thus, members of the clan Nepane-tomoien must use **sahaunue** instead of **peku** for freshwater turtles. Indeed, there may be many other taboos which affect classification, such as the Tobelo in-law name taboo which is reported as affecting all words which share the root of the name [Taylor, 1990: 19–20]. I do not think this particular taboo is important among the Nuaulu, but other (such as sex-linked) taboos are (chapter 2.7). Finally, taboos influence the linguistic contexts in which animal names appear. Thus you may 'joke', mock or use expletives involving certain animals in the village, but you may not do so outside. Among such exclamatory phrases are:

ikae nawe,
'long fish'
mau (w)anae,
'kitten'
asuwani anae,
'young cassowary'
hahu onate,
'large pig'

In the village (and by extension in the gardens as well) these expletives are used extensively in ordinary discourse; in the forest they anger the spirits and bring on heavy rain. While an individual may try to escape the consequences of his utterances, he runs the risk of being swallowed up by the earth. Komisi once told me a story to illustrate this:

One day an elder from the clan Sopanani, his wife and a small child were fishing at Nunu [a sago grove near Hatuhahu] when he suddenly saw a large fish. Taken by surprise, and forgetting he was in the forest, he exclaimed **ikae nawe**! No sooner had he done so than there was a gigantic clap of thunder followed by torrential rain. The family tried to run back to the village, but soon the flood water was up to their necks. The earth then opened up and swallowed them. Only the child lived to tell the tale.

Interestingly, the oath **masi mokota**, 'let the earth open up', is subject to the same taboo.[2] However, other apparently similar phrases fail to have such alarming consequences. Thus, **ikae pukune**, 'short fish', would be no more than amusing since it is so obviously culturally wrong. It is grammatically and semantically accurate, but it is not among those phrases which the Nuaulu regarded as expletives and which consequently invoke the wrath of the ancestors when used inappropriately.

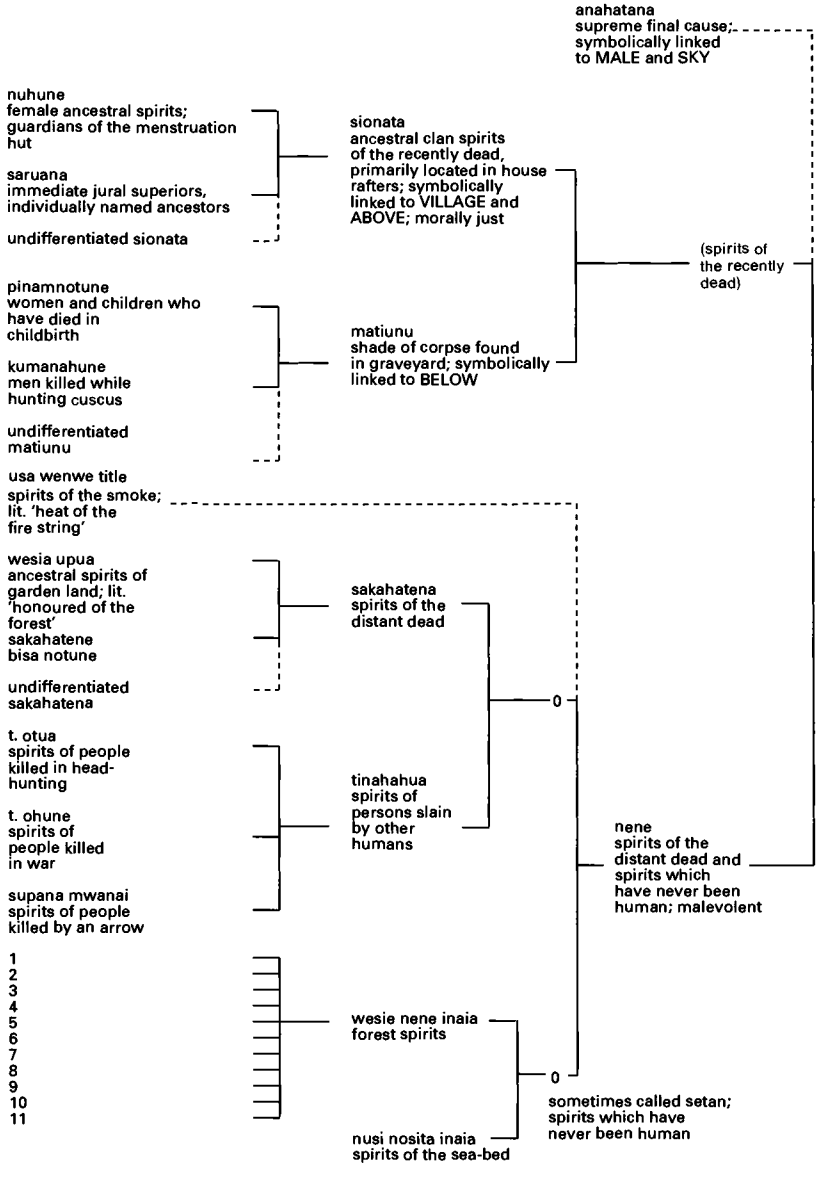
6.6 Animals and the spirit world

The Nuaulu recognise spirit categories in much the same way as they recognise categories of animal; indeed spirits are treated *as* natural kinds, as equally significant parts of their environment. Along with plants and animals, spirits inhabit the Nuaulu universe in every conceivable niche. As flora and fauna both threaten and help them, spirits too have these basic ambivalent characteristics. Accordingly, dealings with them are managed with a considerable degree of caution, but sometimes also with curiosity. People claim to hear and 'see' spirits all the time and I have on occasion been present when the alleged discovery of a particular spirit in a tree, or in a bush, has created scenes of some excitement.

Nuaulu spirit beliefs are complex and only a summary description of them can be given here, sufficient to emphasise their position in the Nuaulu conception of their total environment and to make comprehensible their relation to the discussion which follows. Rather than describe each of the main categories in the text I have summarised their main characteristics and interrelations in figure 6.2. I have deliberately chosen a mode of representation which permits comparison with representational arrangements of animal categories found elsewhere [e.g. Ellen, 1992: figures 5.2 and 6.1].

The essential unity, continuity and overlap of nature and supernature is highlighted in a number of ways. To begin with, some Nuaulu spirit forms appear to describe real animals; for example **sinne inae** (certain scarab and long-horned beetles, including *Oryctes rhinoceros* and *Mulciper linnaei*), **(kau) kama nahune** (edible long-horned beetles such as *Gnoma giraffa* and

Figure 6.2 Tentative classification of Nuaulu spirit entities using taxonomic conventions.



Glenea corona – **kama nahune** being the spirit of a person killed by falling from a tree in the throes of hunting cuscus), **inararai** (the frog *Litoria amboinensis*), and **rikune** (various kinds of bugs and beetles, including *Mictis*, *Oncomeris* and *Euphanta*). Perhaps we should not be surprised if it is insects which are most likely to be redefined as spirits [c.f. Dentan, 1968: 26–7]. Other categories, such as **naka** which refers to those mythical creatures we call dragons, are used by the Nuaulu to label certain real-world animals which they have heard of but never seen, in this case the Komodo 'dragon'. Domains become even more blurred when spirits enter the bodies of animals influencing their behaviour, as when a **sakahatene** can only be discovered by divination, as the **sakahatene** can neither be seen nor heard. The **sakahatene** 'guards' the jaws, motivates and directs the bite.[3] Other spirits are modelled on particular animal prototypes to the extent that experiences of paired entities seem at times to be conflated. Thus, **masenu** are compared with **tuku tuku** (prob. *Otus magicus*), and **ahone** with **sakoa** (*Ninox squamipila*) in their vocalisations. These are both owls and consequently nocturnal, which in itself is significant. Some animals are held to be derived from spirits, such as **isanone** ants from **isanone nanie**. So not only are there sometimes no simple breaks at domain boundaries in what we might construe as the 'real' world (as shown in chapter 4.2), there are even areas of overlap between the objectively visible and invisible.

Given that Nuaulu conceptualise spirits as analogous to animals and that animals (and humans) are the model for their description and representation, we might reasonably expect that as lexical and semantic fields they are organised in essentially the same way [Bouez, 1977; Brown *et al.*, 1976]. And this is what we find – up to a point. Category extension, polysemy, polytypy, binomial nomenclature and so on are all part of the classificatory repertoire as applied to spirits. Spirits too may be grouped along the kind of continua of habitats described elsewhere for fauna [Bulmer, 1967]: horizontally from the village to distant forest, and vertically into aerial, forest canopy, forest floor, subterranean and aquatic zones. But there are important differences, not least in the application of taxonomy. While taxonomies – in theory – are undeniably more easily created for invisible creatures where the hard constraints of messy natural discontinuities do not apply, other distinguishing features of spirits generate obstacles. Simple class inclusion and hierarchy come nowhere near to representing adequately the complex 'multi-levelled', overlapping and ontogenetically-related general categories for spirits.[4] Because they exist only in their descriptions and outward representations, the categories

shade into each other endlessly. Moreover, many spirit-forms are deliberately anomalous in their construction, with combinations of features which do not lend themselves to the relatively simple classifications of the natural world. Thus, while the domain of spirits overlaps and draws upon, and is certainly no less 'real' than, the domain of animals, it is almost as if it comes to parody a world which is unambiguously visible.

The juxtaposition of classifications of spirits and animals, therefore, not only serves to show the structural similarities and the conceptual bases of categories and their relationship to each other, but also reminds us of an important difference: that spirits are in the normal way experientially incorporeal while animals are first experienced as things, even though the Nuaulu 'know' that spirits have bodies and bodies have spirits. The logic of this in one direction is that the Nuaulu must claim to see spirits for them to exist, and in the other that animals must have spirits because of the prohibitions and beliefs surrounding them. But the notion that animals have spirits is problematic if you have to kill them, and Nuaulu culture provides for precisely this contradiction in a very practical way, in rituals connected with wooden meat skewers or **asumate**.[5] Such practical steps, however, if taken to their logical extreme become highly inconvenient in the normal daily round. Far better to rely upon periodic strategic amnesia and operate with two contradictory conceptions of the animal world: one which stresses unity with humankind (and the privilege of taking life for food) and another which stresses the fundamental differences between humans and animals and which legitimates and makes easier their exploitation. Wazir-Jahan Karim, 1981: 188 has identified these two conflicting views in two opposing Ma'Betisek terms, but in the Nuaulu case they must be inferred (see chapter 4).

6.7 Cultural dualism and classificatory anomaly

It is not simply by examining specific representational domains that we can see the interaction of mystical and mundane, of belief and cognition, and the working of essentially similar modes on information organisation [Brown *et al.*, 1976]. We can also approach the problem by looking at particular cognitive strategies. For example, dichotomous division and binary contrast are always evident in the ordering of categories of perception both in academic science (where they appear especially as keys) and in folk classification, and everywhere cognitive proclivities are to varying degrees embellished by the deployment of figurative and symbolic dualism from other cultural spheres. In chapter 3.7 I discussed the creative use of dualism as a strictly linguistic feature. In this section I wish

to note how these devices link up with a wider Nuaulu cosmological scheme, enforcing that scheme and enforced by it.

Parallelism in performative utterance, where paired semantic and syntactic correspondences produce a kind of dyadic language, is a prominent feature of Austronesian languages, and is well documented for eastern Indonesia [Fox, 1988]. The same area is also renowned for its extensive complementary dual classifications with their analogical concordances of elements, and we might imagine that pervasive parallelism would contribute to a dualistic perception of the world, though there is no evidence for a *necessary* connection. Given such linguistic and para-linguistic idioms it would be surprising if there were no influence on styles of categorising and labelling parts of the natural world. We have seen already in this chapter how the symbolic salience attached to certain species, and any prohibitions associated with such, are bound to generate oppositional categories (PROHIBITED:ACCEPTABLE), often reflected in labelling contrasts. But what is in no sense predictable is the degree to which such correspondences will occur and the extent to which they will fit into more general and explicit symbolic schemes. I have shown elsewhere [Ellen, 1975a] how the symbolic pre-eminence of **mara makinete** amongst cuscus necessarily generates an optional classificatory construct **mara makinete**: (**mara osu, mara siha, mara kokowe**), where the residual category is covert. It would be possible to argue along the same lines with respect to the symbolic salience of **teke patona** amongst snakes. Both are, in a sense, supreme examples of their kind, set apart and inevitably contrasted with a less distinctive residue.

Similarly, a large number of adjectival qualifiers (see table 2.6) imply the existence of paired contrasts with symbolic resonances:

metene	black	:white
hanaie	male	:female
numa	house	:forest
niane	village	:forest
nuae	sea	:freshwater
onate	large	:small
inae	mother	:child

Such contrasts are exemplified in the way many Nuaulu categories are divided into terminal pairs, reflected in symmetrical binomial labelling. Thus, **kamanahune** (certain long-horn beetles) is divided into **kamanahu metene** (*Gnoma giraffa*) and **kamanahu putie** (*Glenea corona*); and amongst molluscs we have **nunu mata ipole hanaie** (*Lunella coronatus*) and

Table 6.4. *Partial listing of contents of the category* ***kauke***

Nuaulu term	Meaning of adjectival qualifier	Phylogenetic content
kau (mam) kahe kamane	scrape the **kamane**	various mantids
kau ai otoe	twig	stick-insects
kau hatane	sago palm	Tettigonid bush crickets
kau nimunone	type of weedy herb	focally a bush cricket
kau kapine	type of decorated container	box grasshopper
kau nesate	raw sago flour	large bush crickets
kau putie	white	white bush crickets
kau suto	type of crustacean	bush cricket, *Gryllaocris*
kau tuaman anoe	inside the earth	wingless mole-cricket
kau nuhune	kind of birth ritual	grasshopper
kau hatu tinaie	tree stone	indeterminate
kau suenie	type of bamboo	indeterminate

nunu mata ipole pina (*Angaria lacinatus*), **nunu sesu waene** (*Melania, Melanoides*) and **nunu sesu nuae** (*Latirus turritus*). Some idea of the range of environmental, behavioural and cultural categories involved can be gleaned from the axes of coded contrasts listed in table 4.4. These all fit with ease into a general idiom of dualism (sometimes explicitly), and might be plausibly incorporated into more complex symbolic networks. This, however, is a temptation in many cases to be resisted.

The danger is twofold. Firstly, it may be erroneously assumed that wherever qualifiers occur which are known, in other contexts, to have contrastive – even symbolic – properties, then such terms are in classificatory relations which reflect this. On the contrary, most qualifiers of this kind (colours, habitats or whatever) are parts of terms that label categories that are members of more inclusive categories which have more than two members. Such categories – when speaking of labels these are still described in some circles as 'contrast sets' – defy the application of simple binary logic, and only contrast with each other in more subtle and complex ways. Consider, for example, the various contrasts retrievable from the names of members of the primary category **kauke**, which includes mostly mantids, stick insects, crickets, locusts and grasshoppers (table 6.4).

The second danger is that we be tempted to see all plausible binary contrasts in animal labelling as necessarily part of a wider symbolic scheme. Certainly we should not *expect* a corpus of material to be neatly integrated through binary logic [see Barth, 1975: 180, 185, 212–3], but there are indicators which help us discriminate between the symbolically salient and the merely coincidental. Animals, for example, feature in the

formal language of Nuaulu ritual and ceremony, as in the following couplet from the **kapata ararirane**, the chanting that accompanies a ritualised tug-of-war:

Nusi takanasi	The osprey
Araro ranene	Lands above
Loto simba lahi	Look above
Kom lau sawa	The **komu** [kind of fish] is in the waves

Labels evoking symbolic resonances may match resemblances and contrasts dealt with explicitly through myth [Rosaldo and Atkinson, 1975: 50], though it is difficult to prefigure such associations [Friedberg, 1979b]. Two Nuaulu examples are the contrast **asuwan**:**sopite** (cassowary:hornbill) apparent from the story which tells how the cassowary lost its wings, and the various symbolic contrasts yielded by alternative arrangements for the four terminal cuscus categories [Ellen, 1972; Ellen, 1975a]. There is also the evidence from taboo behaviour already alluded to, where the prohibition on mocking animals outside the confines of the village signifies the latent oppositions *forest: village*, and perhaps even *nature: culture*. Furthermore, in discourse about animals (and indeed about other things) 'two' is often an appropriate way of indicating 'few' in a culture where dualism is ideologically important and dichotomous division prominent in systems of classification. Thus the ground frog **notu** [Ellen *et al.*, 1976b] is said by informants to be commonly found at the base of sago palms, distant from the village and to lay only 'two' eggs in water.

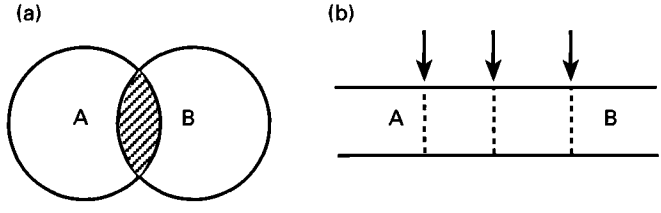
What we do not find is much conscious articulation of the *idea* of contrast or analogy at an abstract level. People do not speak of '*x* being the opposite of *y*', of white being the opposite (**hai**) of black; nor do they employ the analogic 'as *x* is to *y*, then *p* is to *q*', and certainly do not obviously syllogize. This is so even though the existence of the first three types of cognitive process might be reasonably inferred from the data on animal classification. And this may still come as a surprise to those who have internalised structuralist logic, and who somehow see it as a reflection of a self-conscious native logic.

The existence of classificatory anomaly is a direct consequence of cultural intrusion, of which the pervasive dualism just described is a powerful example. All binary oppositions might be said to arise logically from the salience of that category which elicits strongest responses [c.f. Dentan, 1970], in other words that which is linguistically or cognitively marked. It is also encouraged by analytic or folk assumptions to the effect that all categories really are perceptually discrete, bounded units. The

usual representation that we employ to discuss anomaly, that of overlapping circles, betrays this view, though some anomalies may be generated less by overlap than by the uncertain limits of contiguous categories in field-dependent positions, as in the classification of body-parts (figure 6.3). It is these constructions of categories as fixed units with implicit *systemic* definitions which permit their metaphorical employment in the domain of human social relationships, such as we find in totemism.

Anomalies are, therefore, not a necessary result of classificatory or cognitive process, no people need tolerate them [Needham, 1979: 46], and they may dissolve when viewed in a different light [c.f. Cooper, 1975]. While encyclopaedic knowledge is certainly not without its incoherences and contradictions, life is concerned with a continuous effort either to avoid or to correct them. In this sense anomaly is ubiquitous. However, it is important to distinguish 'genuine' anomalies which faithfully reflect inbetweenness or overlap in indigenous schemes from those produced by careless use of taxonomic or other modes of etic representation. If we interpret as monothetic classifications which are polythetic, or employ contrastive logic where concepts are demonstably 'fuzzy', all sorts of problems are going to arise. Repeatedly, 'anomalies' have been shown to be either spurious or culturally irrelevant [Hunn, 1975c: 310; Sperber, 1975; Willis, 1974: 47]. Rather than falling betwixt and between others, such categories may be better portrayed as 'good' categories in their own right; rather than being negatively 'anomalous' they may be positively *singular* [Bulmer, 1979; Friedberg, 1979a; Hunn, 1979]. This has led Sperber [1975: 94] to assert that folk classifications as such generate salience, but a salience which can be represented as either anomalous or exemplary, depending on the circumstance. Whereas the inbuilt, rigorous logic of ethnographic method easily gives rise to anomalies, the informal logics of folk systems permit its avoidance. Moreover, although everywhere the potential number of anomalies greatly exceeds the number that are recognized, let alone held to be significant and taken up in symbolic

Figure 6.3 Anomaly created (a) by overlap and (b) through contiguity.



discourse, in many cases animals which are classificatorily anomalous are of no particular ritual salience [e.g. Hunn, 1975c: 310], and interactions with them fail to provoke any anxiety.

Nevertheless, even given that the flexibility of folk classifications generally allows for a resistance to many potential anomalies, in both ethnobiological and phylogenetic schemes, the more inclusive the categories involved the more likely they are to yield anomalies. Thus 'birds' fly by folk-definition, but some that are otherwise perfectly good members of the class patently do not. At the same time, though, we also find that anomaly can be more readily erased by sophisticated casuistry at more inclusive levels. The clearest Nuaulu example of this kind of problem is in relation to **asuwan**, the cassowary, where myth provides a means of resolution by explaining how the cassowary lost its wings [see Ellen, 1975a: 211–8]. The problem is evident to a lesser extent when it comes to other flightless birds. By contrast, the clearest example of positive singularity of representation, where the ethnographer might be tempted to expect anomaly, is with respect to **marane**, the cuscus [Ellen, 1972].

6.8 Integration of semantic fields: symbolic and mundane

Following Durkheim and Mauss, Douglas [1966: 112], Lévi-Strauss [1966:138] and others have attributed to 'primitive society' an all-embracing, dynamic and undifferentiated world-view integrated through symbolic classification, in contrast to the partial, static, differentiated and relatively unintegrated ones of 'advanced' societies. It is now well attested that insofar as this view is founded upon a *tabula rasa* image of humanity with no innate capacity to classify it is fundamentally flawed. Moreover, it has been suggested that such an approach is wrong-headed because it fails – knowingly or unknowingly – to distinguish technological from symbolic levels of experience [Bloch, 1977; Hunn, 1979; Morris, 1976: 543, 553; Morris, 1979]. This view appears to turn wholly upon the interpretation of a footnote in *Primitive classification* [Durkheim and Mauss, 1963: 81–2, fn. 1] to mean that the argument does *not* apply to descriptive technical schemes, and it now seems to me that what Durkheim and Mauss are actually saying is rather unclear and cannot be taken as unequivocal support for the dualistic approach. But, whatever the historical case, much of what has been said in the literature on the distinction (implicit or explicit) between symbolic, ritual or explanatory schemes and mundane, technological and descriptive ones is at the very least overstated, and I have tried to demonstrate in this chapter that it is difficult to maintain with respect to Nuaulu classification of animals. Totemism – that is where

animals and plants are seen as having classificatory affinities to social groups – animal name and joking taboos, species transformation beliefs, the classification of spirits and anomaly, all demonstrate that animal categories are not morally neutral, and that they are tied to a conceptual universe which transcends the technical particular and refracts (more than reflects) the symbolic general, with its often complex relations with other semantic fields through metaphor and perceptual gradation.

In understanding animal classifications we must therefore encompass the literal and the metaphorical, partly because the distinction (as we have seen) is anyway difficult to draw, and partly because metaphorical *uses* are no less legitimate than those described otherwise. Words signify more than objects designated as referents [e.g. Fox, 1971; Rosaldo, 1972]; they concern *relations* between items of all kinds. Put another way, 'linguistic and social classifications are part of a simultaneity' of event and classification of event, where, to paraphrase Ardener, faunal space has been mapped with language utilising social experience and metaphor [Ardener, 1975: 9]. And if we accept that (whatever the special constraints imposed by the character of its content) so-called mundane classifications of biological domains must be understood as a special case of 'symbolic' classifications, then the observation that such classifications are not hierarchical by definition, and often articulate through unexpected interlinkages [Fox, 1975: 118; Needham, 1979: 67], must be seen as further rendering simple taxonomic models obsolete. Whatever the relationship, an understanding of classifying the material world is an obligatory precondition for the adequate interpretation of symbolic schemata. It is so because the material world – in this case discontinuities in the range, diversity and availability of fauna – sets the outer limits for the selection of natural symbols.

Finally, let me stress the difference between acknowledging continuities, essential similarities and mutual refractions across the imputed mundane–symbolic divide, and the *hard* Durkheimian position familiar from the critiques. My argument favours the former, and few would now doubt that Durkheim and Mauss assume an unjustifiably neat correspondence between a uniform classification and the overall integration of society [Needham, 1963: xviii-xix]. Yet the temptation to pursue the grand correlation between social formation and classificatory style is difficult to resist. Dwyer [Dwyer, 1979: 19, 25], for example, has argued that amongst highland Melanesian peoples the Baktaman dependence on wild animals and a relatively unelaborate social structure is linked to an emphasis on concrete species, nomenclatural specificity and shallow taxonomies; while

the Rofaifo, who are pig husbanders, minimally dependent on wild animals, and who have a complex segmentary system, have a zoological classification which is hierarchically rich and abstract. The Kalam, with their restricted metaphors and more abstraction that the Baktaman, lie somewhere in between [see also Lancy and Strathern, 1981]. It is just about plausible, I suppose, to argue that were Nuaulu social structure to be more hierarchical, then perhaps their classifications would be more obviously taxonomic. As it is, the ever-present possibility of symmetric marital exchanges between clans and routine reciprocal exchanges of ritual services between clan sections (**numa**) serve as a feedback loop which effectively limits the classificatory potential of metaphors of social hierarchy as widely understood in other eastern Indonesian societies.

7

Changes in classifying behaviour

What is true of the particular idiom that we started with is true of everything else in language ... Every word, every grammatical element, every locution, every sound and accent is a slowly changing configuration, moulded by the invisible and impersonal drift that is the life of language

[Sapir, 1921: 171].

7.1 Introduction

Language is never static and much less so when it is unwritten. I wish to argue in this chapter that much work on classification has assumed – at least for the purposes of description – the reverse to be the case. In other words, it has ignored historical change. This has been partly because it has been thought irrelevant in a discourse largely underpinned by assumptions of synchronicity, and partly perhaps because those societies for which we have detailed empirical reports are those least likely to provide the kind of evidence required for an examination of such change. All this has reinforced the view of *classifications* as composed of reified categories, rather than *classifying* as a rule-bound process ever responsive to new situations. This is particularly curious since it would appear that inferences concerning the direction of evolutionary changes in classification – about which much has been written – rest upon an assumption of inherent flexibility in the arrangements of categories. If we start, explicitly, from a demonstration of the extent of such flexibility then our models and reconstructions are not only more consistent, but also more powerful [Dwyer, 1976b: 442].

Though language may be in a state of flux, classifications are

phonologically and semantically conservative. By this apparent paradox I mean that changes generally become permanent and shared only if they cannot be done without. If they must be introduced, then there is a tendency to do so with the greatest economy. Thus, if introduced species of animal can be incorporated somehow into existing categories then this will be done [e.g. Barrau, 1979]; if existing lexemes or parts of lexemes can be deployed in new contexts then they will be. This principle of lexemic economy is well illustrated if we look at the pattern of Nuaulu adjectival qualifiers (see table 2.6). Not only is the ratio of distinct types of qualifier to all binomials low (1 : 9), but there is a skewed distribution in favour of a small number of terms, the four most frequent (**putie**, **metene**, **msinae** and **inae**) accounting for 32 per cent of all instances recorded. Such qualifiers are also generally terms of the widest semantic application in contrast sets: *large : small*, *black : white*, *in the trees : on the ground : in the ground*, *freshwater : seawater*, and so on. But despite such economy, it is possible to locate various kinds of shifts in Nuaulu zoological nomenclature and classificatory tendencies. What follows is a systematic exploration of the reasons for such change, the types of change, and an attempt to reconstruct patterns of changes in relation to known historical events.

7.2 Reasons for change

Apart from the reversible contextual shifts discussed in chapter 5, long-term non-reversible (historical) changes have occurred in Nuaulu animal naming and classifying behaviour. There are at least five reasons for this.

Firstly, particular animal species may become extinct through over-hunting by humans, over-predation by other animals and environmental changes. The evidence for this kind of change on Seram is, however, slight and circumstantial. It is possible that *Babyroussa*, presently confined to Buru, once inhabited Seram. This creature may or may not have become extinct through browsing competition from other, introduced, suids. Its historical presence would certainly resolve one puzzle in Nuaulu terminology for pigs, namely descriptions offered by informants of the quasi-mythic **hahu nihu**. The appearance of introduced forms more generally, especially deer, pigs and murids, is almost certain to have affected the faunal balance in individual niches. In particular, the bandicoot *Rhynochomeles prattorum*, which is now restricted to the Mount Manusela region, may once have been distributed more widely and suffered in competition with introduced rats. In more recent years, some bird species have been hunted to the edge of extinction, for example the

salmon-crested cockatoo (**nakatua putie**, *Cacatua moluccensis*), encouraged by the international cage-bird trade.

Secondly, new species may appear in the local system due to the natural movements of the animals themselves, or due to the introduction of new species by humans. On Seram, domestic strains of pig, goats, dog, monkeys, the horse, the Malay civet (*Viverra tangalunga*), deer, cows, water buffalo, rats and cats have all been introduced, and there is some debate as to whether the list should be extended to include the cassowary, and pigs in general.

Thirdly, human populations may move into areas with new faunas. The Nuaulu have moved from a highland and inland environment to a coastal and lowland one during the past 100 years, bringing them into close contact with marine creatures and a wider range of domesticated stock. More generally on Seram, there is considerable linguistic evidence of population movement, expansion and contraction from the mid-seventeenth century onwards as a result of disturbances accompanying Dutch raiding and the extension of Dutch influence [Collins, 1980].

Fourthly, there may be a change in the cultural significance of animals leading to lexical or categorical change, for example as revealed in marking features [Witkowski and Brown, 1983]. The names of decreasingly significant animals may be forgotten. Conversely, as other animals become more culturally salient the corresponding terms occur with increasing frequency in ordinary language and so become less marked. Terms may become less polysyllabic (that is, shorter) and uninomials replace binomials for the same reason. For example: **man kihoke** > **kihoke** (focally *Lorius domicella*, the black-capped lory), although there are many counter examples of highly salient species with complex terms which are part of regular speech (e.g. **maianane**, deer).

Fifthly, there is linguistic and cultural contact, of which we might distinguish six types.

(a) Knowledge of new animals not physically present in the locality conveyed through contact with other populations may give rise to new categories, often bringing with them new terms, for example **maisan** for 'lion'.

(b) New names and categories may be introduced through habitual multilingualism. People who have a command of more than one language seldom maintain complete lexical separation, and in certain circumstances may freely interchange terms for animals. Moreover, categorisations

implied or associated with one language may, simply because they are available, be transferred into the other if the occasion justifies it. This may account for the introduction of AM 'binatang' (> **binatan**) as a unique beginner for the animal domain. On the other hand, some have suggested that absence of life-form terms in particular languages may provoke resistance to their introduction from other languages where they exist, even where people are fully bilingual [Brown and Chase, 1981].

(c) New terms and categories may be incorporated into existing schemes or may replace parts of old one due to dominance of intrusive groups. thus, on Seram generally the cultural influence of Malay has been very strong for many hundreds of years. It began as a language of trade used by Malay and Javanese traders, was adopted by the Portuguese and Dutch as a language of secular and ecclesiastical control, became a medium of communication for many Seramese speaking mutually unintelligible languages, and after 1946 became the political instrument of the Indonesian state. In the south-central part of Seram, the pre-colonial political hegemony of Sepa, together with its demographic and land-owning preponderance, has influenced the trajectory and pace of Nuaulu linguistic change.

(d) Accompanying Malay language influence has been literacy. The early use of Arabic script must have had little or no effect on Nuaulu language; however the romanisation of Malay which accompanied its acceptance by the Dutch as a medium of administration, trade and education has had progressive implications. Effective schooling was introduced into the Nuaulu area in the early seventies of the present century, and this has made easier the incorporation of Indonesian words and categories and also for the first time has made possible the writing of the Nuaulu language itself using a phonetic alphabet.

(e) Changes in the material conditions of life may affect the exposure to particular species and their significance. Thus, the historically new orientation of the Nuaulu to a seaward economy is increasing their knowledge of marine fauna at the expense of that of the rainforest. The characteristic pattern of classificatory decay here is from 'the bottom up', that is a depletion of terminal categories and their replacement by more inclusive ones with an especial reliance on labelled life-form categories [Berlin, 1972: 83; Brown, 1977: 332]. There is not much hard evidence for this in the Nuaulu case, but in general terms as certain animal resources become

less critical there follows a loss of semantic contact with specific forms, a process encouraged by the abstract conventions of literacy.

(f) Finally, there is linguistic drift, by which I have in mind internal changes in the economy of shared classifications, such as the shortening and uninomialisation of terms, symmetry in class inclusion, and so on. Such modifications are usually occasioned less by linguistically exogenous events than by cognitive rationalisation in periods of otherwise relative stability.

7.3 Mechanisms of classificatory change

The various factors reviewed in the previous section may result in a number of morphologically and semantically distinguishable types of classificatory change: the addition and deletion of separate lexical items, the extension or restriction of reference for particular terms and categories, detachment of label from content, marking changes and changes in more inclusive arrangements. Of course, lexical change may take place without classificatory modification. For example, lexical contraction where polynomials are reduced to binomials, exemplified in the use of optional labels such as **wekae** and **nakatua wekae** (focally, the red-sided eclectus parrot, *Larius roratus*), or change through free variation (as between **muinu** and **moi** (generically, FALCONIFORMES). This latter may result in synonyms, which may also arise through ellipsis. There is evidence, for example, that the synonymous use of **sahaunue** ('coconut shell') for **peku** (Amboinan freshwater turtle, *Cuora amboinensis*), motivated by certain clan prohibitions on the word **peku**, is derived elliptically via **peku sahaunue**, visible in the optional use of this term in clans where freshwater turtle is not prohibited. An example of a more complex classificatory construct which has withstood considerable lexical change is the sub-grouping of the two species of Seramese cuscus, a content which depends on their local co-distribution. The 1 : 1 : 1 : 1 arrangement dominant for the Nuaulu [Ellen, 1975a] appears to continue across a range of Nunusaku and East Seram languages. Thus, in Nuaulu and Bonfia (a highland east-Seram language recorded by Cocq D'Armandville, 1901) we can observe the following set of equivalents:

mara kokowe	mani ramen	*Phalanger orientalis* ♂
mara osu	mani ulien	*Phalanger orientalis* ♀
mara makinete	mani loton	*Phalanger maculatus* ♂
mara siha	mani wasi	*Phalanger maculatus* ♀

Table 7.1. *Some semantic equivalences between otherwise non-cognate animal terms in Nuaulu and other languages*

Nuaulu	AM	Sepa	English gloss	Content
1. **tumane-maine**	ikan mencadu	–	axe fish	poss. *Trichiurus haumela*
2. **ika msinae**	ikan merah	–	red fish	*Lutjanus rufolineatus*
3. **ika uri hatae**	pisang-pisang	ia telewa hatan	banana fish	prob. *Caesio pisang*
4. **ika kori-kori**	ikan kopu-kopu	–	butterfly fish	butterfly and coral fish
5. **ika tunene**	ikan durian	–	durian fish	porcupine fish
6. **ika nane**	ikan layar	–	sail fish	*Istiophorus orientalis*
7. **ika hahu**	ikan babi	ia usau	pig fish	porpoise and dolphins
8. **nunu unie**	bia berduri	–	thorny shell	*Murex, Drupa*

We are now in a position to consider the first mechanism of change listed in the preceding paragraph – the addition and deletion of separate lexical items. New items have been incorporated into the Nuaulu zoological lexicon through the indigenous invention of entirely novel names, through the borrowing of outside terms, the translation of non-Nuaulu terms into Nuaulu and the marking of existing terms. Obvious Nuaulu examples of borrowing of outside terms include **peskada** (sea-horse) and **sapi** ('cattle') from Ambonese Malay, the first also indicating prior Portuguese influence on this lingua franca. Historically early borrowing of Malay terms has resulted in phonological alterations to accord with Nuaulu, although with the greater familiarity with outside languages found today words are often assimilated as they stand [c.f. Taylor, 1990: 40].

As far as the translation of outside terms into Nuaulu is concerned, it is not always easy to distinguish between terms which have been translated from terms whose semantic equivalence arises from the common identification of salient characteristics. A good example is the relationship between the Nuaulu term **nunu unie** and the Malay term 'bia berduri', both meaning 'thorned shell' and referring to the genera *Murex* and *Drupa*. This, together with other illustrations drawn from the primary category **ikae** ('fish') are listed in table 7.1. It must be remembered, of course, that when terms are borrowed or translated they never have precisely the equivalent semantic status as in the original, and have often been wrenched from highly particular sets of cultural, environmental and linguistic associations. Sometimes the reference may alter significantly. This may be the result of misunderstanding. Thus, **nunu unie** has come to be applied by the Nuaulu to seashells of both the genera *Drupa* and *Murex* although in Malay the term is applied only to *Drupa*. *Murex* is

referred to by the term 'congkok tanduk' or 'chinese antler'. This is perhaps understandable, since both are morphologically extremely similar.

Marking is a common means of innovation where closely related forms exist in quite different habitats, as between domesticated and wild. At least initially, domesticated forms of species found in the wild, or closely related species found in the wild, will tend to be marked. Thus the Nuaulu word **mnaha** refers generically to a number of species of wild murid which are not further differentiated terminologically. However, *Mus musculus* (the common commensal house mouse) is termed **mnaha numa** (lit. 'house rat/mouse'). Marked items, therefore, generally indicate more recent acquisition in a language [Brown, 1981].

If species become rare or extinct, terms may simply be forgotten or may become synonyms for other similar types. Terms may also disappear through loss of semantic contact, encouraged by changing patterns of activities, migration and schooling. Learning new languages may provide alternative terms which may ultimately replace older ones. It is virtually impossible to discover such terms for an unwritten language such as Nuaulu, although it is just possible that some of those listed by Stresemann for birds but not elicited during the course of my own fieldwork fall into this category. Stresemann undertook his research in 1911 and the period of almost 80 years which has elapsed since then may have provided just about sufficient generational distance for such a possibility to be considered realistic. For the record these terms and their imputed referents are: **manu asan**, the rainbow bee-eater *Merops ornatus*, and **sisa une**, *Criniger affinis* [Stresemann, 1914: 109, 125].

The phenomenon of expansion of categorical content, or category extension, has already been discussed in chapter 3, and is particularly evident in quasi-experimental situations. Thus, when asking informants to identify pictures of animals in a simple reference work [Tweedie, 1970], **ruka** ('monkey') was always extended to **ruka** ('monkeys and apes'). It may also involve the extension of a terminal or less inclusive category to form a new generic category, and in some cases may be extended to life-forms. In particular, new incipient life-forms may emerge through the tendency of children learning languages to over-generalise meanings [Brown and Chase, 1981].

Restriction of meaning is typified by the English example: O.E. 'deer' (animals in general) > 'deer' (a particular kind of animal). One of the most common ways in which this may happen is through the extinction of particular species, or through changes in patterns of subsistence

behaviour which result in reduced or nil contact with a species once clearly identified. Restriction of reference may also occur in the opposite situation, that is where the number of forms to which a category is applied is increasing. This is most usually apparent in the development of compound labels along a 'kind of' path [Brown, 1979: 267]. Thus, the meaning of Nuaulu **imasasae** (broadly, all geckos) is restricted when used as shorthand for the label **imasasae numa** (common house gecko: *Hemidactylus frenatus*).

Metaphors similarly constitute special instances of restriction of reference along a conjunctive 'kind of' path. But while the common compound labels of folk classifications encode the empirically obvious, metaphor encodes associations which are not so obvious. Common Nuaulu examples consisting of a modifier and a principal lexical items denoting a class of things include most binomials employing the qualifiers **pina** ('female') and **hanaie** ('male') when applied to species or above, and terms such as **mita hahu** ('pig prawn').

In some cases significant changes may take place without the addition or deletion of lexical items, or without any expansion or restriction in meaning in the usual sense. Instead, labels and reference content within a particular segment of classificatory space may become detached. Such a condition is evident in the use of 'loose labels' to mark out diagnostic differences within the skink category **poso** [Ellen *et al.*, 1976a], and in the variable labelling of frogs other than **poro-poro** [Ellen *et al.*, 1976b]. I have suggested in the case of frogs that this may reflect a decrease in their significance as food, though with skinks so such utilitarian explanation will do.

New animals may subsequently become more culturally significant than the form they were originally designated 'a kind of' [Witkowski and Brown, 1983]. This takes place through a three-phase process:

	Unmarked term	Marked term
1.	x(=y)	
2.	x(=y)	x′(=z)
3.	x(=z)	

I know of no reliable Moluccan examples of this process. More common are incomplete reversals consisting of phases 1 and 2. Thus, in the languages of Bati Saie (east Seram) we find:

faniki (bat) > **manu faniki** (cuscus; lit. 'bird-bat').

A common method of naming a new cultural item is to add it as a low-salience referent to an already existing term creating a polysemous lexical item. For example, Nuaulu **manue** primarily designates 'bird' in general, and secondarily designates the domesticated chicken, *Gallus gallus*. The optional qualifiers **tulalakane** ('cockerel') and **inae** ('hen') are used if context is insufficient to indicate the latter, and where it is important to do so.

Overt marking with an obligatory modifier is allied to polysemy, but serves somewhat different functions. The referential content of the lexical mark focuses attention on semantic contrasts that are culturally important in naming cultural items, as in the contrast *wild : tame*. Although when domestic animals are initially introduced they sometimes receive a marked name, it is usually the wild form which is marked. This is so because domestic animals after they have been thoroughly assimilated are usually economically more important than wild animals and lexical marking reflects this exceptional status [Witkowski and Brown, 1983: 577]. The following Nuaulu cases illustrate the pattern well:

1 **imanona** (various rats generally associated with human habitation, but mainly *Rattus exulans*) > **imanona ai ukune** (lit. 'tree top' rat: most probably *Melomys fulgens*).
2 **asu** (domestic dog, *Canis familiaris*) > **asu manene** (wild stock of *Canis*).[1]

By changes in classificatory arrangement I understand shifts in the way categories (usually labelled) are related to other comparable, less inclusive and more inclusive categories rather than changes in the reference of individual categories themselves. Clearly, the two processes are interrelated and the distinction is essentially a pragmatic one. Such changes may arise through the introduction of foreign non-basic terms to indicate categories not previously recognised, or which had hitherto been covert. Nuaulu use of **binatan** as a unique beginner may provide evidence for such a shift. Slightly differently, the use of the indigenous term **notu** (a specific kind of frog) as a pseudo life-form label may have arisen in response to the need to find a serviceable gloss for AM 'kodok' (frogs in general). Classificatory change may also arise through cumulative changes in lexis at the basic or terminal level. Something of this kind might reasonably be imputed to have followed Nuaulu movement to the coast and exposure to a large number of new types of saltwater fish, as some kind of *ad hoc* intermediate grouping on grounds of morphology, behaviour and habitat would have become necessary to cope with an extraordinary newfound diversity.

Table 7.2. *Terms in selected Moluccan languages for some endemic animal species*

LANGUAGE GROUP	PIG	CUSCUS[1]	FRUIT BAT	MONITOR
A. Nunusaku				
1. Nuaulu	hahu	marane	notane	puo
2. Hila	hahu	makel	karong	pu-e
3. Elpaputih	hahu		unjolo	
			karune	
4. Wahai	haho			
5. Allang	hahu		ralunno	
6. Amahai	hahu			
7. Alune	apale	marele	salune	
B. East Seram				
8. Kilmuri	boi			
9. Gorom	boi	kidor	faniki	buara
10. Bati Saie	boi	manuk faniki	buka	
C. Southeast Moluccan				
11. Kei-Elat	fafo	mender		muke
12. Kei-Tual	wauw	mendar	ye bar	bu'u
	CROCODILE	COCKATOO	HORNBILL	MEGAPODE
A. Nunusaku				
1. Nuaulu	puha	nakatua	sopite	muma
2. Hila	huwa			
3. Elpaputih	huwawalo	[manu]?healo	mahu sopite	momalo
	huae	lakatua		
4. Wahai	huwa			
5. Allang		kakatua routa	manu kyopa	
6. Amahai	huwawalo	lakatua	manjalalo	momala
7. Alune	huae	la'atua	'ala'we	mleune?
B. East Seram				
9. Gorom	wai	kakatua		
10. Bati Saie	waia		salar	bau
C. Southeast Moluccan				
11. Kei-Elat	fwe			
12. Kei-Tual	uve			
	PYTHON	HUMAN LOUSE	MOSQUITO	ANT
A. Nunusaku				
1. Nuaulu	teke patona	utu	kunte	kinawerie, isanone
2. Hila	ngia petola	utu	umut	manise
3. Elpaputih	njia ahinandur	utu	manise	tutume, foina
4. Wahai	nia ila	utun	umuti	isalema
5. Allang	nia ilata?			
6. Amahai	inyalo	u'u	umu	simakauro
	inya	u'uro	umu olo	sumaka'u
7. Alune	nia'we tola	'utue	mumule	watene, wam lala'we

Table 7.2 (*cont.*)

LANGUAGE GROUP	PIG	CUSCUS[1]	FRUIT BAT	MONITOR
B. East Seram				
9. Gorom	tekis ?	kutu		
10. Bati Saie				
C. Southeast Moluccan				
11. Kei-Elat	belbeluk salweli			
12. Kei-Tual	haur	ut	semaat	kerikim

Sources: Nuaulu [Ellen], Hila [Ludeking, 1868], Elpaputih [Stokhof (ed.), 1981], Wahai [Ludeking, 1868], Allang [Ludeking 1868], Amahai [Ludeking, 1868, Stokhof (ed.), 1981], Alune [Margaret Florey, pers. comm., Stokhof (ed.), 1981], Kilmuri [Ellen], Gorom [Cocq D'Armandville, 1901, Ellen], Bati Saie [Ellen], Kei-Elat [Ellen], Kei-Tual [Ellen].

Note: 1. Blust, 1982: 241 lists Asilulu 'marel', Kei-Elat 'mender' and Kei-Tual 'medar' as possible cognates, glossed by 'bandicoot, marsupial rat' (*mansar). If fact, they all refer to marsupial cuscus of the genus *Phalanger*. The bandicoot or 'marsupial rat' is rare in the Moluccas.

7.4 History of animal terms in the Moluccas: terms for endemic fauna

The term 'native' fauna is defined here in a strictly zoological sense; that is all animals which have not been introduced through human agency. Obviously, there are going to be animals the precise status of which is difficult to ascertain. In the Moluccas, this would be the case for the cassowary and possibly even the pig (as we have seen). I have deliberately chosen examples of animal terms which are quite unambiguously 'native', and which also refer to animals at a phylogenetic generic level, that is not to species or varieties, or more inclusive categories. Terms for endemic animals in selected languages are set out in table 7.2. In this and other tables in chapter 7 the language groupings follow those designated by Collins [Collins, 1980], the genetic relationship and geographical distribution of which is summarised in figure 7.1.

The terms are of four types:

1. Those which can be reconstructed from Proto-Austronesian roots e.g. 'human louse', 'crocodile', 'pig'.
2. Those which can be reconstructed from Proto-Maluku, which are cognate throughout the family, with a few local exceptions, e.g. 'mosquito', 'cockatoo'.
3. Those which show a tendency to reinforce language sub-groupings e.g. 'pig', 'crocodile'.
4. Those which show a more complicated pattern e.g. 'cuscus', 'fruit bat', 'hornbill', 'ant', 'python'.

In the case of types 1 and 2 we can be fairly certain that the predominant forms which we are dealing with have archaic Proto-Austronesian roots. Some of these are displayed in table 7.3.

With type 3 we are dealing with more recent divergences due to isolation and migration. Of course, even when dealing with native fauna it is possible for terms to change, sometimes in curious ways. A predictable way is for a life-form term to be prefixed to a terminal or primary category as in Bati Saie **manuk faniki** ('bird-bat') for cuscus, or Amahai **manu sopite**

Figure 7.1 Genetic and geographical relationship of Central and Southeast Moluccan languages. Individual languages listed in accompanying tables (see table 7.2) are shown according to reference number.

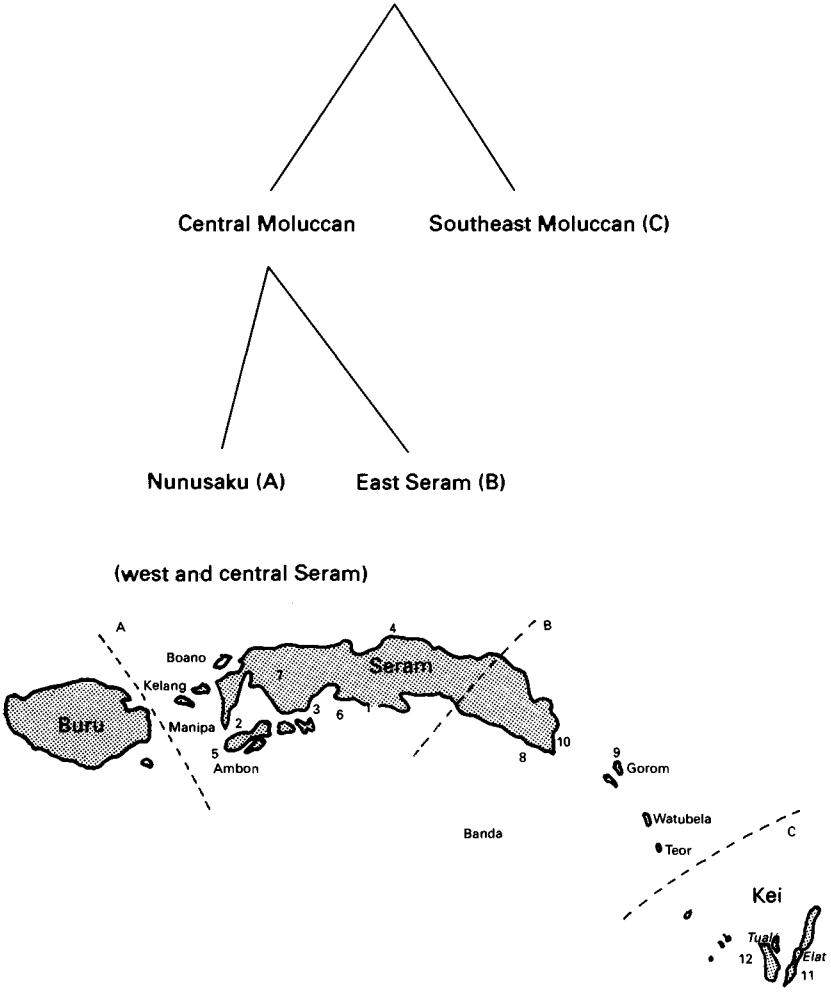


Table 7.3. *Nuaulu animal terms reconstructable from Proto-Austronesian roots*[1]

	Content	PAN	Nuaulu	Selected Central Maluku languages
A	dog	*asu	asu	asu (Manipa), asu (Wahai),*kapuna (Geser)
	crocodile	*buqaya	puha	hua(Asilulu)
	pig	*babuy	hahu	apale(Alune), papu(Watui), haruro (Ruta), boi (Gorom)
	centipede	*lipan	niniane	
	fowl	*manuk	manu	
	cassowary	*kasuari	asuwan	kasawari (Hitu), ?asawari (Paulohi), asuwanu (Wahai)
	pigeon	*baluj	puane	
	fly	*lanaw	imanane	
	grasshopper	*gau?	kauke	
B	garfish	*s Ru	sonu	selu (Boano)
	stingray	*paRi	hari	ani (Boano), ali (Hitu)
	dugong	*Duyu	mata luyun	luine (Boano)
	shark	*qiSu	ika woku	weu (Asilulu)

Note: 1. To ensure reliability, I have wherever possible drawn from comparative material collected over the last decade by Blust [Blust, 1984–5: 63], Bolton [Bolton, 1990: 50] and Collins [Collins, 1980]. However, in some cases the examples have been supplemented by material collected by myself and that available from other published works.

('bird-hornbill), for hornbill. In the case of 'python' this has happened in all the cases cited, with the exception of Kei-Tual **huar**. The intrusion of the life-form term here is obviously early to be so extensive, but the variety in life-form prefixes means that the process must have taken place independently and in parallel in at least three separate localities. I shall come back to life-forms later. Another change which seems to occur frequently with such terms is that those for morphologically similar forms may be switched. Thus in Elpaputih **manise** is 'mosquito' while in Hila it is (a type of?) 'ant'; similarly **semaat** is 'mosquito' in Tual, but is almost certainly cognate with AM 'semut' (ant). Finally, some languages show more than one term for the forms listed, e.g. Nuaulu and Alune terms for ants. Whether such data are accurate is not always apparent from published lists. Some investigators may be satisfied having obtained a single term, and may not prompt for a second. Others may find plural terms where properly these are no more than dialectal differences. The elicitation of plural terms for particular animal forms requires persistent prompting, often over a period of time.

The terms in table 7.3 show a general similarity throughout central Moluccan languages, but in attempting to reconstruct Nuaulu linguistic change we must separate out lists A and B. List A consists of terrestrial and freshwater animals for which there must be a strong presumption of

familiarity to the Nuaulu and their ethnic predecessors going back to the original Proto-Austronesian stock. Chlenov [Chlenov, 1980: 437] has suggested that the larger the number of roots for a particular word in Austronesian languages, the older the word. The proportion of roots for 'chicken' and 'dog' is far less than those for 'sago' and 'banana', suggesting their more recent innovation. On this basis, Nuaulu animal terms for 'crocodile', 'pig' and all sea creatures in list A would appear to be more archaic than 'chicken' and 'dog'.[2]

List B consists of marine animals. Now, when the Nuaulu or their predecessors became entirely a people of the interior it is likely that they would have retained some words for sea animals. There must have always been some form of contact with the coast and useful or otherwise salient sea creatures must have featured in the Nuaulu animal lexicon. On the other hand, many words must have disappeared or changed, and their cognates only restored to use through contact with coastal peoples since the nineteenth century. Thus, it is possible that the Nuaulu **woku** is a direct borrowing from Sepa for shark. In the case of the dugong, **mata luyun**, the term appears to have been influenced by AM, and may also be a direct borrowing from other coastal languages of south Seram modified with AM prefixes or classifiers.

Special attention should perhaps be drawn to the terms for cassowary. The terms **asuwan** and **kasuari** are cognate. Stresemann [Stresemann, 1914: 46], who renders the Nuaulu term **asuan**, follows Kern [Kern, 1900] in suggesting that both are derived from 'asu' (dog) and 'suari' (bird) in Malay and Old Javanese. Thus, the composite character of the term lends credence to the argument that the cassowary was introduced to Seram by human agency; the fact that both '*asu' and '*kasuari' are PAN terms suggests familiarity at a very early date. If we look at the coastal languages of Irian Jaya the terms for cassowary are very different.

Roughly speaking, the rarer, less salient and more ecologically specialised the species, the greater the variation between languages. Thus, using data drawn from Stresemann [1914], the cockatoo, *Cacatua moluccensis*, and the Moluccas scrub hen, *Eulipoa wallacei*, are labelled in a consistently uniform way across the range of Moluccan languages, though there may be some switching of terms between the two species of megapode known in the region or use of the term of widest application for megapodes as a whole. On the other hand, the black-capped lory, *Lorius domicella*, equally widespread, is **kihoke** in Nuaulu, 'hiro' in Amahai, 'soete' in Paulohi, 'soi' in Rumakai, 'ulasue' in Sapalewa, 'soke' in Eti and 'loja' in Manusela. Similarly, the hornbill, *Rhyticeros plicatus*, is **sopite** in

Nuaulu, 'manjalalo' in Amahai, 'aluene' in Piru, 'manu hala' in Rumakai, 'alakue' in Sapalewa and 'salar' in Bati Saie. Thus, some terms which in Nuaulu are clearly applied to one species turn up in another language applied to another species. For example, *Philemon subcorniculatus* is clearly labelled by Nuaulu informants as **kinoke**, although this same species is labelled 'soete (suite)' in Paulohi (the Nuaulu term for an unidentified small passerine), and 'soi' in Rumakai (a term the Nuaulu apply to the glossy swiftlet, *Collocalia esculenta*).

In identifying animal terms reconstructable from Proto-Central Maluku it is necessary to distinguish terms which have been in continuous use from those which have been lost and then re-acquired. Thus, although it is possible that the Nuaulu have continuously used the term **yapato**, we should not rule out the possibility that it was a PCM root lost and then re-acquired as a loan word from Sepa, where it appears to be identical. Many marine-linked terms of PCM origin would have been lost when the predecessors of the Nuaulu became a people of the interior. Among them appears to have been the word derived from 'galawani' for 'whale', which takes the form '?alawano' in Tehoru. Contemporary Nuaulu uses **ika baus** or **bau baus** from AM.

Without having exhaustive ethnozoological lexicons for all central Moluccan languages it is impossible to know how many Nuaulu terms can be reconstructed to PAN, PCM and PECM, or how many are loan words acquired from other central Moluccan languages in relatively recent times. Here I have only been able to provide a few examples. We might, however, suppose that of the genetically assimilated roots most are for the basic language level, for primary categories, while recent loanwords tend to be for terminal categories. However, what we must note (and this may reflect badly on the pretension actually to reconstruct meaning effectively) is that terms often change their categoric range over a period of time. Thus we *assume* that PAN '*babuy' really does *mean* 'pig'. I have shown above how words may disappear, and then loanwords re-appear with the same root referring to much the same semantic range: it is difficult to know how important a phenomenon this is, but I suggest that it is quite common. Some of the meanings attributed to PAN words are highly problematic. For example, '*qualoj' is interpreted as 'worm', but 'worm' is such an imprecise term that it is confusing. Whatever its PAN meaning, in some part of its history since the elaboration and separation of Austronesian languages it appears to have acquired residual life-form status, referring to worm-like animals of very different phylogenetic kinds. Thus in Saparua 'ure-ureo' refers to the very special

Table 7.4. *Terms in selected Moluccan languages for introduced animals*

	DOG	CAT	COW	HORSE	GOAT
A. Nunusaku					
1. Nuaulu	asu	mau	sapi/korobou	naitanane	une-une
2. Hila	asu	sia	sapi	kuda	pipi
3. Elpaputih	asu	sia	korobou	aikarane	
4. Wahai	asu				
5. Allang					pipi
6. Amahai	asu(ro)	sia(lo)	sapi/korbou	aitalano	une
7. Alune	(w)asu	mau	sapi	kolopou?	pipi
B. East Seram					
8. Kilmuri	kafuna				
9. Gorom	kafuna, kahuna	sia, sikar	sapi	kuda	bibi
10. Bati Saie	kafuna	sika	sapi	lajarang	bibia
C. Southeast Moluccan					
11. Kei-Elat	asu	sika	sambe		bimbi
12. Kei-Tual	yahau		sab		bib
	WATER BUFFALO	RAT	DEER	CIVET	MONKEY
A. Nunusaku					
1. Nuaulu	korobou	imanona/ mnaha	maianane	tui-tui	ruka
2. Hila		malahu	manjangan	musang (sialo)	
3. Elpaputih		malaha ilailai	ma'iyarane		kesi
4. Wahai		mulaan	mairaran		jakiss
5. Allang			menjangan	mawo?	
6. Amahai		muraha hinadalo	mayan(g)		ruala
					kes
7. Alune	kolpouneli?	mlaba'we	maralane	lau?	o'ese
B. East Seram					
8. Kilmuri		kariotta	rusa		kiti
9. Gorom		karufa	rusa		
10. Bati Saie	korebau	karufa tanah	rusa	kafuna laku	leki
C. Southeast Moluccan					
11. Kei-Elat		fulover			
12. Kei-Tual		karu	rus		leik
	CAS-SOWARY	CHICKEN	DUCK		
A. Nunusaku					
1. Nuaulu	asuwan	manue	pepeko		
2. Hila	kasuari	manu	bebek		
3. Elpaputih	asawari	manu			
4. Wahai		maluk			
5. Allang	kasuwarie	manua			

Table 7.4 (*cont.*)

	DOG	CAT	COW	HORSE	GOAT
6. Amahai	asuwanu asuwaro	manu olo			
7. Alune	a ali	manu			
B. East Seram					
8. Kilmuri		manuk			
9. Gorom	kasuari	manu(k)	bebaka, beba rek-rek		
10. Bati Baie	kasali	manuk	bebak		
C. Southeast Moluccan					
11. Kei-Elat		manuk	membek		
12. Kei-Tual	kaswair	manut	bebak		

Note: For language sources see table 7.2.

edible marine worm *Eunice viridis*, but in Nuaulu the cognates **une-une** and **uneu** (pl.) refer to 'caterpillars' and 'maggots', but not grubs. The earthworm term is quite different, being **tuaman inae**. The term for earthworm on Kei in quite different again, being 'kadkadir'. Likewise, the root '*manuk' varies widely geographically and through time as to the semantic level at which it operates; very often, as in contemporary Nuaulu, it is polysemous.

Another factor affecting change is the replacement of animal names with puns or figures of speech [Collins, 1980: 168]. Thus, the PCM root 'garaur' is not found in the most important terms for frogs, although it may conceivably be reflected in the terms **kere** and **kako** used for certain Ranid and Microhylid frogs. Instead, the two most prominent terms for frogs are **poro-poro** and **notu**. **Notu** is also the word for 'fart' (**inotu**: 'to fart'); **poro-poro** is a likely onomatope, though **poro** also means 'foolish, silly'.

7.5 Lexical and classificatory change in recent Nuaulu history: terms for introduced fauna

The terms listed in table 7.4 fall into four types:

1 Those which are cognate throughout the range e.g. 'cassowary', 'chicken', 'duck', 'water buffalo' and 'cow'.
2 Those which are cognate throughout the range with a few local exceptions e.g. 'goat', 'cat'.
3 Those which show a tendency to reinforce language sub-groupings e.g. 'rat', 'dog', 'deer'.
4 Those which show a more complicated pattern e.g. 'civet', 'monkey' and 'horse'.

What is interesting about the table is that it suggests no regular relationship between the age of introduction and the pattern of terms. Most recent introductions, such as 'cow' and 'water buffalo', we would expect to be similar, if not identical; but then we might reasonably expect the same of 'horse'. However, the number of animals falling into types 1 and 2 is 7 as opposed to the 4 in table 7.4; this we might assume to represent a general tendency towards greater similarity in introduced terms. Interestingly, there are few examples of attempts terminologically to include introduced forms into pre-existing categories; the exception would seem to be the Bati Saie 'kafuna-laku' (dog-'laku') for civet. Finally, in the case of the Nuaulu we have further examples of animal forms referred to by more than one term ('rat' and 'civet', 'cow'; the particular circumstances of these usages are explained in the companion volume, Ellen, 1993); and also an example of the diametrically opposed situation, that is two introduced animals being referred to by the same term ('water buffalo').

There are a number of significant events and trends in Nuaulu history which we might reasonably expect to have had consequences for their classifcation of animals:

1 Contact on the periphery of Asian trading systems up to 1600: introduction of new animal species: monkey, water buffalo, deer, civet, rats; introduction of images of animals not seen: e.g. elephant.
2 Incorporation within the area of European economic influence, more specifically within the Dutch colonial system: introduction of new animal species: horse, cow.
3 Movement of Nuaulu clans within the interior and resettlement along the coast between 1880 and 1960: exposure to new environments, particularly marine environments. Influence of Sepa and AM.
4 Impact of modern Indonesian, wider world knowledge, literacy and scientific classifications.

7.6 Contact with the Asian trading system prior to 1511

The date 1511 marks the year in which Antońio d'Abreu arrived in the Moluccas, and thus the beginning of the period of direct European influence. The pre-European period saw the introduction of dogs, civet cats, goats, rats and domestic cats. It possibly also saw the introduction of the cassowary and, in limited areas, and perhaps only temporarily, water buffalo and deer. The Nuaulu terms for these animals show some evidence for having been borrowed.

Other animals, although certainly not introduced, appear to have acquired new names during this period. A striking example is that of the reticulate python, **teke patona**. The word **patona** and its cognates ('patola, patora') are found widely in Indonesian languages, are derived from the Sanskrit, and are generally applied to cloths imported from the Indian sub-continent to the region over a period of many hundreds of years [Ellen, 1993: chap. 6], although the term does not appear in historical (Javanese) records until the sixteenth century [Barnes, 1989: 19, following Buhler]. In various Moluccan languages the term is used for the reticulate python on account of a similarity between the lozenge design on the cloths and the skin pattern of the snake. In the Nuaulu case, as in the others, the change must reflect the importance of these cloths in ritual and exchange. At the present time there are very few **patona** cloths remaining in the Nuaulu area. Their disappearance threatens to undermine the rituals for which they are required and may lead to their cessation.[3]

Similarly, in many CM languages, including Nuaulu, the predictable reflexes of the PAN '*la(n)ka' were replaced in a complex way by terms displaying AM 'kakatua'. Collins (pers. comm.) suggests the Seramese proto form 'lakatua' (big parrot) was transposed into Malay as 'kakatua' (making it more like 'elder brother') and then reintroduced to Maluku where it began to replace older 'laka/naka' forms. Thus in Paulohi it is 'lakatua', in Kamarian 'laka' and in Nuaulu **nakatua**. In the Nuaulu case this did not remain a simple matter of lexical substitution: it had classificatory consequences. In contemporary Nuaulu usage the white Moluccan cockatoo (*Cacatua moluccensis*), usually labelled 'kakatua' in Malay, and focally the red-sided eclectus parrot (*Larius roratus*), form a pair: the first is known as **nakatua putie** (or sometimes simply **nakatua**), and the second **wekae**, or occasionally **nakatua wekae**. Thus Malay 'akatua' has been extended to include at least one other species. Moreover, the salient form has been marked. Collins [Collins, 1980: 168] has suggested that this change has arisen though the importance of the white cockatoo in trade, perhaps combined with the fact that the original names were concealed because this is widely held as a sacred bird and totem. Chlenov [Chlenov, 1980: 437] has similarly argued that many terms important for trade became incorporated into the language and tend to be borrowed from consumers of the product and often coincide with words for 'gold' and 'wealth'. In Nuaulu another term consistent with this hypothesis is **pala** (for nutmeg). Among Nuaulu terms for birds, **kunini** (focally *Eos bornea*) may also represent an introduction linked to prominence in trade (AM 'kuning' > **kunini**). At the present time **kasituri** (AM 'kasturi') is

sometimes used by Nuaulu as a general term for various parrots and lories (including *Charmosyna* and *Eos*), and may be an incipient change of this kind.

No doubt also during this time the Nuaulu became aware of distant animals which they had never seen, through the introduction of their images, for example on bronze reliefs and cloth, and gave them names. There is evidence that such images circulated in eastern Indonesia in the form of representations of lions and horses on Dongson-style bronzes [Heekeren, van, 1958: pl. 7, fig. 12]. The Nuaulu term **maisan** (< 'macan') for 'tiger, lion, elephant' may have been acquired in this way.

Malay had already become the language of trade by the fifteenth century. Some Malay words may have been incorporated at this time, though it must be said that knowledge of Malay was highly restricted, even on Ambon [Danckaerts 1859]. The earliest evidence of the use of Malay in the Moluccas in dealings with the outside world dates from 1514, from which year Portuguese translations of two Malay letters from the king of Ternate found in Malacca are known. Two epistles preserved in the original from 1521 and 1527, also from Ternate, are written in a style of Malay showing distinctive peculiarities which suggest Ternatan influence [Cense, 1978: 418]. But although Malay terms for introduced and endemic animals are known to have been current, they were not necessarily adopted. Thus, Pigafetta's Malay vocabulary of 1521, which though clearly recorded during a six-week stay on Tidore in an Islamic environment must to some extent reflect Moluccan usages of the time [Bausani, 1960; Gonda, 1938], lists 'gajah', 'kuda', 'lembu', 'rusa', 'kujuk', 'hurimau', 'biri-biri', 'kambing', 'burung', 'tikus' and 'kutching (pusa)', referring respectively to elephant, horse, cow, deer, dog, lion/tiger, sheep, goat, bird, rat and domestic cat. Apart from 'gajah', none of these were adopted in any form by the Nuaulu, unless they have subsequently disappeared.

7.7 European contact

The seventeenth and eighteenth centuries saw the development of Ambonese Malay as a distinct local pidgin [Collins, 1983; Collins, 1984: 87], as European and Asian trade increased, as a result of Dutch administrative and ecclesiastical needs and a deliberate policy of preventing the use of local languages, as well as through informal acculturation. From a fairly early date this must have included a number of Portuguese terms for animals [Grijns *et al.* 1983; Manuputty, 1972] as illustrated in table 7.5. Of these, only one (**muria**) is occasionally heard in Nuaulu speech, perhaps as

Table 7.5. *Ambonese Malay animal terms with Portuguese origins*

Portuguese	Ambonese Malay	English gloss
macariko	masariku	k.o. seagull
salamandra	salamander	–[1]
cavalo	kavalo(arch.)	horse
mursego	marsegu	bat
tartaruga	teteruga	turtle
morea	moria	eel
pombo	pombo	dove
pes(kada)	peskada	sea horse

Note: 1. The gloss here is uncertain. The Portuguese term (from the Arabic 'semandar') originally referred to a mythical creature supposed to live in fire. Zoologically, it is generally applied to tailed amphibians of the urodelous family Salamandridae or some closely allied family. There are no true salamanders in the Moluccas although in AM it may refer to boldly patterned geckos such as *Gekko vittatus* [Ellen *et al.*, 1976a]. Jim Collins (pers. comm.) reports its use as a fish term.

a means of collectively referring to eels, which are otherwise covered by the terms **awane** (freshwater) and **yapato** (marine).

The Dutch period in the Moluccas saw the effective introduction of animals which may have been present previously in limited numbers, such as the horse and the cow. In Rumphius's time 'hens, geese, ducks and many domesticated pigeons were kept in large numbers' [Kraneveld, 1959: 152]. In the 1630s (certainly by 1636) cattle were being imported into Ambon from Japara, Balambuang (Besuki) and Batavia, mainly to supply the Dutch garrison with fresh meat. Cattle were introduced into Banda from Bali and Balambuang [*ibid.*, 148–9], as well as 'bucks'. In fact, throughout the colonial period the Moluccas were regularly supplied with cattle.

Monkeys are mentioned in passing by Rumphius, and these were no doubt present as domestic pets as this time. Many more animals were introduced into limited areas of the Moluccas at this time, but have since become locally extinct, or survive in areas remote from the Nuaulu. Thus, Valentijn [1724–6: V, 2.9, 293; also Rumphius 1741–55: Aud., 69] mentions the presence of the mongoose *Herpestes javanicus* in Ambon and *Callosciurus* or *Tupaia*, where it was a pest in coconut plantations [Valentijn 1724–6: V, 276–7, Rumphius 1741–55: Lib. I, 15]. *Tupaia* survives in the Kei islands. Even if they had not become permanent features of the Nuaulu language by this time, this period must have seen the introduction of the AM terms **sapi** (cow) and **korabou** (cow, water buffalo), possibly **gaja** (elephant) and **rompa** (from the Arabic 'domba' for sheep); and also **peskada** for *Hippocampus*, 'sea-horse'. This latter is a curiosity, as in Portuguese 'pescada' refers to cod. It is possible that we have here a

Table 7.6. *Identical or near-identical terms for fish in Nuaulu and Sepa*

	Nuaulu	Sepa	Focal phylogenetic content	English gloss
1	**(ika) mate**	**ia ma'ato**	*Clupea schrammi* *C. stereolepsis*	herring herring
2	**wanu**	**waru**	*Hemiramphus marginatus*	needlefish
3	**woku**	**woku**		sharks
4	**pia**	**pia**	*Kishinoella tonggol*	tuna
5	**ika hahu**	**ia usau**	*Stenella*	porpoises and dolphins
6	**ika hari**	**ia lahi-lahi**	*Dasyatis kuhlii*	ray
7	**wotu-wotu**	**wotu**	*Paraplotosus albilabris*	
8	**sunu**	**ia sunu**	*Monocanthus tormentosus*	
9	**punu**	**punu**	*Cheilinus diagramma*	cockatoo fish
10	**keuro**	**keulo**	*Cypselurus nigripennis*	flying fish
11	**mate inae**	**ma'ato inan**	*Clupea longiceps*	sardine
12	**komu**	**kom**	*Trichiurus savalo*	cutlass fish
13	**petie**	**ia patilo, ia seru**	*Ophiocephalus*	pike
14	**namue**	**nam**		catfish
15	**ika ka**	**ia ka**	*Lutjanus fulviflamma*	snapper
16	**taniri**	**tiniri**	*Sphyraenella chrysataenia*	barracudas
17	**ika lasiato**	**ia lasiato**		gobies, blennies
18	**lema**	**lema**	*Rastrelliger neglectus*	mackerel
19	**yapato**	**yapato**	Muraenid eels	
20	**tuyo hutan**	**tujo hutan**		unident. saltwater fish

borrowing based on a fanciful folk-etymology: 'pes' (Portuguese for fish(+ 'kuda' (Malay for horse).

7.8 Nuaulu movement and resettlement

For many hundreds of years the Nuaulu must have visited the coast and had some knowledge of its distinctive fauna. Certainly, by the middle of the seventeenth century they had established a special relationship with Sepa and restricted bilingualism must have led to the introduction of terms from the language of Sepa. However, the movement to the coast, which began around the middle of the last century, led to permanent exposure to new environments, particularly marine biotopes. With subsistence extraction from these new environments new terms and categories were added to the Nuaulu language, mostly terms for saltwater fish (table 7.6).

Six of the fish terms listed in table 7.6 are also cognate with AM terms: **mate** (AM 'maki'), **hari** (AM 'ikan pari'), **komu**, **kema** (AM 'lemah'), **taniri** (AM 'tenggiri') and **tuyo hutan**. In these cases it is not always clear whether the terms entered Nuaulu directly from AM, from Sepa, or indirectly from AM through Sepa. The first of these possibilities is unlikely, as there is no good reason why the Nuaulu should adopt an AM term when more commonly circulating Sepa terms must have been

Table 7.7. *Ratios of Nuaulu terms for marine and freshwater fish according to comparative linguistic similarity*

	Saltwater and estuarine	Freshwater and saltwater	Total
All Nuaulu fish terms	49	23	72
Nuaulu terms identical or near-identical with AM	13	1	14
Nuaulu terms identical of near-identical with Sepa	17	–	17

accessible. Few Nuaulu fish terms occur in AM but not in Sepa: **momar**, **peskada**, **ika baus** (**bau baus**), and possibly **monosia**. The third of these possibilities is improbable as there is no plausible explanation as to why terms should have been introduced into Sepa since the sixteenth century for endemic species.

Despite the influences mentioned at the beginning of this section, the continuing relative unfamiliarity of the Nuaulu with marine fish is reflected in the smaller number of terms overall, the large proportion of saltwater to freshwater species, the use of more general terms, and flexibility (table 7.7). I have insufficient data on AM and Sepa terms for molluscs, though an inspection of appendix 10 would seem to suggest few borrowings at this period. The reason for this may lie with the durability of shells and their trade into the highlands prior to coastalisation.

7.9 Colonial and post-colonial administrations

The administrative requirement to use Ambonese Malay when dealing with the colonial government, its agencies, and anyone other than the inhabitants of Sepa and Tamilou must have led to growing fluency in this language from 1850 onwards. This has increased greatly with Indonesian independence and with schooling in the 1970s, which is conducted entirely in the national language. At the same time, there is generally more contact with the outside world. Pictures, books, photographs, radio and now television are all media which have to some extent shaped Nuaulu understanding of the biological world. Specifically, such contacts have resulted in:

1 Many more words for animals, not only from Ambonese Malay but from standard Indonesian, thus introducing western scientific categories.
2 Systematic use of Malay principles of classification and concepts used in animal classification e.g. **asal** (Ar.) or **jenis**. Some of these reflect scientific taxonomy.

3 Increased knowledge about animals from a western scientific angle.

For example, there is a demand for a category to include mammalian quadrupeds. This appears to have given rise to some incipient or 'emerging' life-form terms for WUG (focally invertebrates such as insects) and MAMMAL e.g. **hahu-maianane**. Such terms encompass creatures residual in the existing Nuaulu classification, but which for various reasons are becoming increasingly salient. The main criterion here would appear to be dimension-size [Brown and Chase, 1981]. The existing Nuaulu incipient life-form term based primarily on dimension-size, **peni**, is clearly at variance with Indonesian usages of 'burung' and 'mammalia' ('bangsa binatang bersusu'). Some incipient WUG and MAMMAL classes have a membership limited to only unidentifiable residual animals. Fully-fledged MAMMAL and WUG typically include most if not all residual creatures, whether they are identifiable or not. Of course, many residual categories may not in this sense be life-forms at all.

It is too soon to assess the impact of direct literacy on Nuaulu animal classification, a domain which because it is not central to the focal uses of literate communication is probably relatively resistant to change. Some changes, however, together with their implications, have already been hinted at in chapter 1. Indirectly, of course, literacy has also been influential through its effects on the lexicon of other written languages.

7.10 The evolution of Austronesian animal life-form nomenclature

In his various writings, Berlin has suggested that ethnobotanical ranks are added to languages in a particular sequence: generic > [life-form, specific] > [intermediate, varietal] > unique beginner [Berlin, 1972: 53]. With Bulmer *et al.*, 1975: 22, I dislike this terminology because logically generics *must* anticipate specifics, and also because empirically many Nuaulu uninomials are applied to what are in Berlin's terms conceptually 'specifics'. Berlin has also suggested that life-form terms are added to languages in a regular sequence, and Brown [1979] has now suggested a similar process for the pan-global development of animal life-form terms.

In its earliest published formulation, Brown uses material from 112 languages (based on both first-hand studies of classification and dictionary sources) to argue that folk-zoological life-form (suprageneric) categories are added to languages in the sequence:

$$1 > 3\ [\text{FISH, BIRD, SNAKE}] > 4\ [\text{WUG}] > 5\ [\text{MAMMAL}]$$

Thus, FISH, BIRD and SNAKE are encoded at stages 1 to 3 (though in no particular order), WUG is encoded at stage 4 and MAMMAL at stage

5. If MAMMAL is present then the other four life-forms will be present, if WUG is present then FISH, BIRD and SNAKE will be present. There are exceptions to this, but 94 per cent of the cases surveyed conformed to the encoding sequence. These five life-form categories are reckoned pervasive cross-culturally. The precedence of FISH, BIRD and SNAKE over WUG and MAMMAL is understandable given that the first three categories exhibit strong clustering of criteria, while the last two are relatively indistinct, residual and strongly influenced by a binary distinction based on size (chapter 3.4). In a more recent paper, and using 144 non-dictionary sources, Brown [1981] has revised his sequence to include stage 0 (no life-forms) and to change stage 4 to WUG or MAMMAL. The remaining life-forms are encoded at stage 5. Environmental constraints (e.g. absence of fish), diffusion and genetic relationship may influence life-form growth. Brown also argues for a relationship between societal complexity and combinations of life-form categories. Stages 1–3 are generally typical of small-scale societies, with little political integration, social stratification or technological elaboration. Stages 4–5 are typical of complex societies. This innovation appears to be motivated by the replacement of numerous terminal categories with fewer, more abstract, more frequently used and salient higher-order categories, which are more useful in societies where there is little practical contact with animal species [Brown, 1981; Witkowski and Brown, 1978: 445–6].

Brown [1979: 6796] includes life-form data from six western Austronesian languages: Tausug and Bontok Igorot with two terms; Indonesian, Kayan, and Tagalog with four terms and Tiruray with 5 terms. The evidence for east Indonesian languages generally, and for Nuaulu and most central Moluccan languages, is for three life-forms until recent times, namely FISH, BIRD and SNAKE.

This would seem to be in accordance with Brown's prediction. He also claims that if there are two terms then these will be FISH and SNAKE, though the PCM evidence suggests that SNAKE as an unambiguous life-form may have been added after Moluccan languages had begun to diversify. Table 7.8 indicates the three life-forms that regularly occur in lists of Moluccan animal names. Virtually all terms for BIRD are cognate and those for FISH are cognate with the exception of Tual 'wu'ut'. There are, however, at least three (possibly four or five) separate sub-groupings of cognates for SNAKE. This pattern may be explained by examining the terms for 'worm' and other kinds of 'creepy-crawley', since these are sometimes classified under the same life-form and later separate out. In Nuaulu, for example, the term for 'centipede' is **niniane**. Combined

Table 7.8. *Life-form terms in selected Moluccan languages*

Language group	Language	BIRD	FISH	SNAKE
A. Nunusaku	1. Nuaulu	manue	ikae	tekene
	2. Hila	manu	ian	ngia
	3. Amahai	manu	ija	njia
	4. Wahai	malok	jan	tipolim
	5. Allang	manu	ijan	nia-
	Waai	manu	ijan	nia-
	Nusalaut	manu	ija	njia-
	Buru-Kajeli	manu	ija	niha
B. East Seram	6. Kilmuri	maut	ikan?	tekis
	9. Gorom	manu	i(k)an	te'is
	10. Bati Saie	manuk	ikan	ve-koh-sa
	Lissibatta	manu	jane	nia
	Hatuwe	malu	ian	tipolon
C. Southeast Moluccan	11. Kei-Elat	?	ikan	nyia
	12. Kei-Tual	mon	wu'ut	nif

Note: For language sources see table 7.2

'snake–worm' terms are, in fact, common [Brown, 1979]. By contrast, **manu** is a PAN form of archaic origin which occurs regularly in Moluccan languages, both as life-form and for chicken. This implies an archaic polysemy, though one occurring through expansion of reference.

One final important rider should be added at this point. We have seen from Chapter 4 that if we are not to descend into tautology of the kind 'FISH' is a life-form because creatures like FISH are regularly encoded as life-forms', then we are bound to include other 'life-forms', such as TURTLE or FROG. The comparative Moluccan evidence is for the most part fragmentary and only tells us about the minimum number of life-forms in particular languages. Also, it is difficult to infer from many of the lists which terms might be recent introductions, for example AM and Indonesian WUG and MAMMAL. In the timescale of separation of these languages any correlation between number of life-form terms and societal complexity does not appear to make much sense, except with the obvious case of modern Indonesian, highly influenced by European languages and modern classification.

7.11 Conclusion

So, when Brown talks in formal terms about how categories are added to languages he neglects the contingencies of local historical process. We are conditioned to think of the evolution of human thought and representations, no less than technology, as somehow getting incrementally more

complex and extensive; but what may look like a steady accumulation of terms at an aggregate level is in particular localities often a process with pronounced oscillations in the growth and decline of classificatory schemata and their terminological extrusions. Maybe this seems a familiar kind of objection and it is certainly not to say that we should therefore reject any distinction between *specific* historical trajectories and *general* evolutionary trends; it is only to warn against reductionism either way. A much more interesting project is that which seeks to map out the middle ground which connects the two. I would like to argue that PAN or PCM speakers had no less rich a language, no less diverse a set of words for animals, and ways of arranging them than contemporary Nuaulu, that is the same capacity as any orally-transmitted culture in *Homo sapiens*. There is no reason to think that anything short of literacy and modern communications should have altered this. Labels and categories shift, and what is culturally salient alters, but despite classificatory change through extension, restriction or ellipsis, and even if reference and salience alters and the labels remain the same, there is nevertheless continuous intelligibility.

And then there are the more technical problems involved in historical reconstruction. Brown has to go to some lengths to show that the complex life-form categories of some people fit into his neat code. It involves a lot of *ad hoc* judgements in particular cases with a bias which may influence the statistical inferences at the higher level of abstraction. In some cases, terms may not be used as life-forms, and may simply have been expected by investigators and therefore recorded as such. If, as Dwyer, 1976b: 425, has suggested, classificatory evolution has been dominated by predominantly upward shifts in the conceptual level for archetypal (mainly connotative) categories, we should not assume that similar terms will have the same semantic rank. Moreover, other life-forms, incipient or otherwise, may have been missed, especially those which have been lost.

Finally, there is the matter of 'borrowing'. It is clear that PAN, Proto-Maluku, Proto-Nunusaku, Proto-East Seram and Proto-Kei terms have similar roots. With the gradual separation of these language groups terms innovated have shown great diversity, that is until the recent historical introductions of the last 400 years which display much similarity in overall form. It would seem, therefore, that the predominant way in which terms with referents at all degrees of inclusiveness have been acquired in recent history is by borrowing from external sources [Brown and Chase, 1981] rather than independent invention. However, this raises the question as to why it is we should assume borrowing to be only an

historically recent phenomenon. Certainly, animal introduction and extinctions, cultural contact and domination, as well as lexical change, have all been accelerating over the last 400 years, but languages have always been in contact and borrowing always a potential source of innovation. Innovation in animal classifications, as with everything else, is essentially a process of cognitive reorganisation, where innovations substitute an element from one folk classification into another, either by borrowing from a different person or group of persons, or even by 'a sort of idiosyncratic metaphorical equating of different domains' within the same speech community which shares common classificatory practices [Sturtevant, 1964: 123; Wallace, 1970].

8

Cognition and the cultural relations of prehension

Man and life and nature are none of them domains that present themselves to the curiosity of knowledge spontaneously and passively *[Foucault, 1970: 72]*

8.1 Introduction

Over more than a decade analyses of the various connections between cognition and collective representations, mind and culture, and between 'mundane' and 'symbolic' classifications, have all received a certain degree of prominence in the professional anthropological literature. In contrast to some writers [e.g. Bloch, 1977; Bloch, 1985], my own view is that the interrelationships between these apparent opposites, as evident in particular substantive cases, are often far from clear [Ellen, 1979a; c.f. Harris and Heelas, 1979]. In large part, the present book is an attempt to vindicate this view in relation to a specific body of data. Having said as much, it is clear that some confusion has arisen from a failure to distinguish clearly instruments (means or agents) of cognitive process from the medium of belief and cultural representation. A generation of anthropologists, most distinguished of which are perhaps Claude Lévi-Strauss, Edmund Leach and Mary Douglas, have tended to conflate cognition with collective representations, but as Bloch [Bloch, 1985: 30] has insisted, we cannot treat cognition as some arbitrarily-imposed scheme. The kinds of cognitive process which I have outlined are apparent in the social construction of categories across the complete range of human experience, 'mundane' no less than 'symbolic'. Thus, if we wish to understand the processes which underly classifying activity *in general*, and which connect the instruments of cognition with ethnographic appearances, we would do well to begin with those processes through which are catego-

rised the discontinuities of (as far as this is ever possible) unsocialised nature. Despite feedbacks from pre-existing classifications and representations, and their inextricable social contextualisation, animals and plants provide us with some of the simplest possible – in a word, 'elementary' – relationships between objects and their representations accessible to researchers producing data in natural settings. Categories of natural kinds are about as rooted in the empirical world as categories can ever get, and in a way that those applied to the world of people and social phenomena can never be. So, while ethnobiology is in no sense unaffected by cultural relativities, it is sufficiently less so to serve as a convenient bench-mark when examining classification more widely.

The latter conclusion implies a distinction grounded in the kinds of 'entities' subjected to classifying activity, though it is sometimes presented as one between specialised theoretical approaches. Emiko Ohnuki-Tierney – for example – has suggested that whereas cognitive anthropology focusses upon the phases in which memory codes are established, symbolic anthropology deals with the phases in which analogy codes are formulated [Ohnuki-Tierney, 1981]. I cannot agree that such professional distinctions relate to completely separate things, historically or processually. The model which emerges here, and the evidence which supports it, indicates the mutual embeddedness of instrument and medium, individual perception and collective representation, in terms of linguistic expression, metaphorical penetration and classificatory structures involved: separate phenomena intrinsically bound together in individual instances. In this final chapter I wish to examine in particular that classificatory device – taxonomy – which more than any other has muddied the distinction between cognition and collective representation. I begin by providing a resumé of the various objections and then, in the light of my own analysis of Nuaulu ethnozoology, go on to outline a broader alternative approach focussing on the concept of *prehension*.

8.2 Against a general taxonomic theory of categorisation

In its strict and technical sense, taxonomy is an hierarchical metaphor involving linked notions of rank, level and contrast (figure 8.1). In European thought, it finds its first known historical expression in Aristotle, has been much influenced by folk uses, but has since passed via Linnaeus into modern biology [Atran, 1990]. As a model of classification it had gained such wide currency by the middle of the present century that a great many ethnographers assumed that it must also necessarily order the folk schemes they were beginning to describe and analyse. This

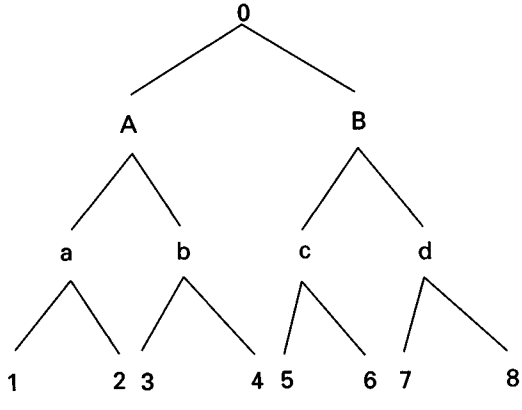
assumption has given rise to the formal theories associated most closely with Brent Berlin and the American school of ethnosemantics. In the last decade these theories have come under sustained attack.

The objections have been various and interconnected [e.g. Ellen, 1979a; Ellen, 1979b; Fox, 1975: 118–9; Friedberg, 1968; Friedberg, 1970; Healey, 1978–9; Hunn, 1976; Hunn, 1977b; Hunn, 1982 despite Hunn, 1975b, Taylor 1990: 60–83]. However, it is helpful to present them under a limited number of headings, even at the risk of appearing to conflate certain matters and separate others that are clearly linked. The headings are: definition, rank and level, contrast, flexibility, context, taxonomising as a thought process, taxonomic artifacts and taxonomy as theory.

1. Definition

It has not helped matters greatly that there has been some confusion over what, precisely, is meant by 'taxonomy'. For some it is no more than a synonym for classification, and folk taxonomies are thus seen as equivalent to folk classifications. Thus, Berlin, Breedlove and Raven [Berlin *et al.*, 1973: 214] use *taxa* to refer to all 'linguistically recognized groupings of organisms of varying degrees of inclusiveness'. The confusion is compounded by the different meanings attached to the term and its cognates in different European languages. In French, *taxonomie* is broadly equiv-

Figure 8.1 Standard abstract representation of a taxonomy. Upper case letters, lower-case letters and figures respectively indicate items at the same *level*. Items at the same level are regarded as being in a relationship of *contrast*. Items at each subordinate level are contrasting *segregates* of a *more-inclusive class* at the next highest level.



alent to the narrow definition of 'taxonomy' in English; while *taxinomie* (from the Greek *taxis*) has a much broader reference. Thus, as Claudine Friedberg [Friedberg, 1968: 315] points out, A. P. de Candolle used *taxonomie* but Lévi-Strauss uses *taxinomie*. It is, of course, possible that this distinction is responsible for the different usages of English-language writers. Here, and throughout this work, I have employed taxonomy only in its strict Aristotelian sense. That is, in the ideal sense understood by Kay, 1971, as a model which owes its form to the Linnaean analogy expressed in set theoretic terms.

2. Rank and level

The notion of hierarchy is integral to the taxonomic model found in ethnobiology. Berlin, Breedlove and Raven [1973: 214] pursue the logic further and suggest that taxa of differing degrees of inclusiveness can be placed in a limited number of ranked categorical types (unique beginner, life-form, generic, specific, varietal) and that these characteristically occur at the same taxonomic level. Upon these distinctions and definitions they erect a complex theoretical edifice which is then used to describe particular ethnographic cases.

The notion of hierarchy, at least as it has been applied to entire classifications, and the insistence on assigning categories to different levels, has sometimes given rise to problems which are altogether spurious. The concept of 'level', except in a limited and rather crude way, is very difficult to demonstrate beyond particular local regions of classificatory space in particular domains of particular peoples. Similarly, although, used in a loose metaphorical way, all folk classifications are 'hierarchic', none are of great depth [Hunn, 1976: 509]. If we wish to retain some semblance of taxonomic organisation we might preferably do so by opting for the tree-diagram model rather than that of a true taxonomy. That is, not by making *a priori* assumptions as to level. Thus in figure 8.1, although it may well be possible to demonstrate 'local' contrasts (1:2), we cannot always show with the same ease that 1 contrasts laterally with 8 even though 1 and 8 may share the same number of categorical links from 0, as in: 0Bd8, 0Aa1.

The recognition of taxonomic rank requires 'inelegant complications of formal taxonomic models' [Hunn, 1976: 510], provides no basis either for distinguishing induction from deduction, for explaining how taxa or other categories are actually generated, for handling non-transitivity, or for the fact that paired and contrasted items do not necessarily imply more inclusive categories [Brown, 1979: 794–5; Lancy and Strathern,

1981: 78]. I summarise some of the reasons why this should be so in the remainder of this section.

The employment of a notion of hierarchy and contrast is partly a matter of metaphoric style, and there are many ways of picturing what in effect has the same mathematical structure [Gay, 1981: 115]. It may be more appropriate, for example, to express inclusivity in the relations between categories in terms of 'broadness' and 'narrowness'. Moreover, there appears to be a curious notion that classificatory space is consistent with a type of two-dimensional graphic representation which, historically and ethnographically, is of limited extent. Indigenous conceptual arrangements and their linguistic expression may be least violated by employing other means of representation: networks of focal points around which categories cluster, Venn diagrams in two or three dimensions, 'sphere of influence' models, or 'type-token' representations [Bright and Bright, 1965; Ellen, 1979a: 12–4; Ellen, 1979b: 354–7; Frake, 1969 (1964): 132; Friedberg, 1970; Tyler, 1978: 278–9]. Hunn [Hunn, 1976: 513] has employed the notion of a system of differences in 'classification space'. Distances within this space are assessed in terms of overall similarity and difference between organisms with respect to perceptible attributes of morphology and behaviour.

3. Contrast

The model of taxonomy employed by Berlin, Breedlove and Raven [1973: 214] requires that categories at the same level be mutually exclusive and contrasting. This ethnosystematicist notion developed in conjunction with componential analysis, which has proved inadequate for defining such concepts [Burling, 1964; Hunn, 1976: 509; c.f. Turner, 1974: 16–7]. Folk-biological categories in general are not defined by reference to verbalisable feature contrasts, let alone single characters. They are semantic primitives, at their lower levels generated by induction [Hunn, 1975c: 313; Hunn, 1976: 515]. In some classifications not even the notion of contrast need be present, at least not in the sense that we normally understand it. Thus, rather than something being **x** or **y** it is common for it to be more **x** than **y**, or more **y** than **x**. The idea of gradation eliminates distinct boundaries and has been termed by Lakoff, 1972 'fuzziness'. Thus we are invited to speak of 'shrubness' or 'treeness', 'birdness' or 'snakeness' [Randall, 1976: 549–51]. The vagueness can sometimes exceed even such fuzzy expressions as these, especially in the form of such hedges as 'well, it might be', 'it's a sort of bird' (where the stress is on 'sort' rather than 'bird'), and 'may be'. All of this fits well

with the idea that the prevailing relations between categories are through polythesis.

4. Flexibility

The problem of applying notions of hierarchy and contrast consistently leads us to suggest that taxonomies (and particularly those that are imputed to rest predominantly upon morphological distinctions) have often been assumed incorrectly to be the only (or if not the only then certainly the primary or dominant) means of classification. Berlin's approach has been strongly and widely criticized for attempting to impose a form of taxonomic rigidity on a cultural apparatus the general characteristics of which are quite antithetical: namely fluidity, flexibility and elasticity [Bulmer, 1974: 24; Dwyer, 1976b: 442; Ellen, 1979a; Healey, 1978–9]. For Friedberg [1974: 327] there is a multiplicity of systems of reference, and there is always the possibility of disjunction between the separate spheres of nomenclature, identification and classification; or we might say between 'models for' and 'models of', or keys and classifications. It would appear then that taxonomies have to be extracted and created from a much more complex classificatory web of which they are part, and in the process even constructed in the interests of neat presentation. The evidence for the inadequacy of taxonomy has come to light partly through the so-called 'special problems', which many have seen as simply the artifacts of method. Examples of these include multiple and interlocking hierarchies, the employment of radically different principles at different levels, and extra-hierarchic relations [e.g. Conklin, 1962: 129; Perchonock and Werner, 1969: 232, 234]. Thus, to say that a taxonomy has cross-cutting classes is to beg the primacy of the taxonomy itself, especially when such categories are highly significant in cultural terms, however we may agree to measure this. Synonymy, homonymy, polysemy and anomaly, as we have seen in earlier chapters of this book, all lead us to question the legitimacy of a predominantly taxonomic approach in which there are distinct ranked levels and clearly-bounded contrasting categories. Covert categories, insofar as they can be demonstrated to exist at all, seem to contradict the very idea of taxonomy, as does the fact that taxonomic categories appear in many cases not to partition classificatory space exhaustively, leaving 'empty' and unlabelled residual regions [c.f. Hunn, 1976: 57–8; Kay, 1971: 878, Taylor 1990: 64–5]. And all of this is not simply a matter of empty theoretical or methodological assertion, but arises from the direct experience of ethnographers attempting to represent the actual means by which real people set about employing categories and

labels, and the relations between them, in their everyday lives. I have tried to show this myself for the Nuaulu, who (for example) most inclusively divide the category (**notane**) labelled in English as 'bat' in terms of both the contrast *fruit-eaters: others* and *cave-dwellers: others*, and this despite significant areas of overlap in content. Rather than explaining away such complications as 'special problems' (peripheralising them, making them exceptions to the rule), I am inclined to regard them as central and inseparable devices of classificatory thought. In particular there appear to be considerable options in folk classifying behaviour in terms of the degree of elaboration at internal degrees of inclusiveness [Bulmer, 1967: 24; Healey, 1978–9: 362; Majnep and Bulmer, 1977: 48]. The evidence for conflicting arrangements, cross-cutting ties and so on is now so overwhelming that it cannot be ignored in any general theory [Bulmer and Menzies, 1972–3; Bulmer *et al.*, 1975; Dwyer, 1976b; Healey, 1978–9: 364].

5. Context

Trenchant also has been the criticism of taxonomic and allied ethnobiological studies for becoming divorced from the situational considerations of ethnography, of the context in which folk classifying takes place [Ellen, 1979a; Friedberg, 1974: 320; Martin, 1975]. The problem with decontextualisation is not simply that it isolates classifications from the rest of culture and thus presents us with something that is abstract, but that by shedding extraneous cultural information it presents us with the illusion that knowledge consists merely in understanding resemblances [c.f. Foucault, 1970: 111]. In other words, it is a complete reversal of the ethnoscience position in which an adequate description should provide enough information to know how to perform in a culturally acceptable manner. If the decision is made to isolate classifications as formal systems, treating each as a separate universe of discourse after the fashion of a mathematics which can be used for any description, we reduce classification to the realm of technical procedures, and taxonomies can easily be shown to be adequate descriptions of that reality. The elimination of context enables the assumption that what is being examined is, in fact, a formal *system*. Identifying a taxonomic or other classificatory system is just like identifying a religious 'system' in a tribal society; it is always possible to isolate it if you want to, but to do so may lead to a complete misunderstanding of its structure, function and position in the social and cultural fabric. Social and cultural anthropologists, of all people, cannot make this assumption [Harrison, 1970; Harrison, 1977].

6. Taxonomising as a thought process

There has been an assumption in much formalistic research that the reconstruction of taxonomic hierarchies provides us with a basis for understanding thought processes involved in classifying behaviour, that categories are classified in a particular way as a reflection of how people think. It is now clear that taxonomic classifications play a lesser role in human thinking than has been hitherto assumed, especially outside the area of biological kinds [Wierzbicka, 1984: 325]. Strictly taxonomic categories have often not been distinguished from other types of categories, the conceptual relation 'kind of' has not been clearly dissected from the referential relation of set inclusion [Wierzbicka, 1984: 313, 315]. Even where there is evidence that taxonomy is a dominant organising characteristic this may tell us more about collective belief than individual thought. Classification need in no sense 'reflect the thought processes of individuals currently utilising the beliefs under consideration,...[and] because collective representations are inherited they are unlikely to reflect current cognition invariably' [Harris and Heelas, 1979: 23].

This scepticism has been reflected in the more empirical concerns of ethnobiologists. Randall, 1976 has criticized the taxonomic model on the grounds that its assumptions about transitivity suggest incorrectly that elicited taxonomies represent structures involved in memory storage. Rather, he suggests, taxonomic trees are often the expected *results* of classifying behaviour, and not the means by which information is stored or manipulated. It is also now clear that certain hierarchical relations are not transitive, and that complex hierarchies are often a product of the procedures used. Connections between different categories are often made in short-cuts in ways which seem to violate taxonomic reconstructions. Thus, in figure 8.1, the relationship between 1 and, say, 6, is not arrived at via the route *aABd* (as would be necessary using taxonomic logic), but often directly or through another terminal-level category. We may therefore conclude with Hunn [1977a: 12] that: 'it is more valid psychologically to describe the classificatory structure as based on non-hierarchical relations of perceived similarity'. This is why tridimensional 'network' and spatial models are somehow more attractive than the two-dimensional taxonomy. Moreover, as Hunn has pointed out, 'taxonomic theory provides no basis for distinguishing induction from deduction in logical thought'. He argues that more inclusive categories, such as 'birdoid', are determined deductively, while less inclusive categories, such as 'sparrow', are determined inductively [Hunn, 1976: 510, 519].

7. Producing taxonomic artifacts

If taxonomies do not reflect the actual psychological processes involved in many of those activities we describe as classifying, it is necessary to ask what it is they do reflect. They were at first thought to reflect a true emic model. This, after all, was the aim of the 'new ethnography' of which it has been a noteworthy part. It does, however, begin to look more like an etic model of the emic, and then of a very particular kind, where the analyst has already decided what the model should contain and has selected results accordingly, even rejecting some statements on the grounds that they appeared to represent the idiosyncratic interests of particular informants.

What they do reflect, of course, to a very considerable extent, is an observer's model of taxonomy, which in its most 'tight' stereotypical Linnaean form has been outlined by Kay, 1971. The attraction of such a model lies partly in its intrinsic aesthetic appeal, partly in a desire for parsimony, lucidity and rational order, partly in its demonstrable resemblance to some processes in folk classifying, but partly also in its implicit and occasionally explicit mimicry of scientific natural historical taxonomy and linguistics. This latter influence is evident in terms of how the enterprise is phrased, the ways in which data are conceived, in the technical procedures for elicitation, in the formal precision of analysis and in the formulation of the problematic. In some cases, I would suggest that individuals with a grounding in natural history have a hidden bias towards finding 'natural' categories, and towards an under-emphasis of variation, with a corresponding stress on an ethnobiological taxonomic approach. One gets the impression that the taxonomists are by inclination collectors, and as Bulmer [Bulmer, 1974: 82] has pertinently remarked:

> almost all collectors like nice, perfect specimens, and derive considerable aesthetic pleasure from the ordering *they* impose on them. A danger which the ethnobiologist must guard against very consciously is that of letting his personal aesthetic judgements override his data

But more generally, while the specific scientific model is certainly the immediate and most obvious source for representations of folk models, it is well to remember that the taxonomic model and its close classificatory congeners are grounded in a special cultural tradition. As was stressed in chapter 1, the graphic and written representation of the relations between categories markedly alters, rigidifies and directs their conceptualisation.

In addition to the specific conventions of literacy, graphic representation and the scientific tradition, there is the general fact that in all inter-cultural communication (of which ethnobiological ethnography is

just one, very specialised, example) all local explanations have to be rendered in a form that is in some sense meaningful to the ethnographer. Although we pride ourselves on our grasp of alternative worldviews and organising principles, we cannot be sure that we ever know everything that is relevant, since knowledge may be cast in an idiom with which we are quite unfamiliar and therefore ill-placed to understand. The history of anthropological theory itself provides ample confirmation of this, as successive explanatory frameworks are able to indicate previously unexpected relationships and arrangements in old data. Moreover, within the confines of our own range of conceptualisation we are always predisposed (by virtue of our cultural socialisation and professional training) to favour one view rather than another.

The attraction of the taxonomic model is that once you have data devoid of contextual considerations (in their widest sense) it is virtually impossible not to put a taxonomic construction upon them. It is easy enough to represent a classification as taxonomically ordered and based entirely on morphological criteria if you assert *a priori* that this is what you are looking for. If you are attempting to reconstruct a native conceptual universe as it applies to plants and animals then you cannot begin by excluding categories and arrangements based on non-morphological criteria since informants do not, in the course of their ordinary lives, necessarily make such discriminations. In my experience people do not regularly make judgements which suggest that they operate with an all-purpose classification which is recognised as being in any way separate from, or different to, classifications organised in some other way.

As soon as you begin to exclude certain categories and arrangements from consideration then, of course, you begin to yield regularities which look much more like contrasting, hierarchically-ordered and ranked 'taxa'. Thus, the unambiguous all-purpose, morphologically-based taxonomy is something which the ethnographer or linguist *extracts*, but even then seldom perfectly. What is extracted may serve as a basis for establishing the existence of universal processes, schemes of categories, but equally it may do no more than reflect an artifact created by common techniques of extraction and representation. What is more, the very character of taxonomising as a process generates anomalies.

To summarise: all of the principal data-production techniques employed in cognitive anthropology and ethnoscience tend to provide us with taxonomies and their associated anomalies [see also Gardner, 1976]. Formalised question-and-answer-frame techniques to a large extent determine the outcome and constrain otherwise articulate informants.

Informants, unprompted, rarely in the course of their ordinary lives will use expressions such as 'is x a kind of y?', or 'how many kinds of y are there?'. Culturally inappropriate questions, assumptions as to the existence of unitary correct representations, are commonplace. We have all experienced severe frustration in attempting to answer correctly and honestly multiple-answer questions or public opinion poll-style survey questions. But in addition to this, techniques such as card- or slip-sorting, the drawing of tree diagrams and other techniques which mechanically encode an implicit or explicit assumption to dichotomise successively, will unfailingly provide formal hierarchies, while eliciting definitions ruthlessly erases any fuzziness between categories as ordinarily used. It is only possible to approach the essential cultural reality of categories if techniques are *for the most part* basically non-directive, that is much looser and more varied [see Perchonock and Werner, 1969: 236–8]. Hence, in my own work I have increasingly relied on simply listening to people talking about animals, using prompts which are less inclined to force the data into formal taxonomies.

I am particularly troubled that some scholars should believe so readily that taxonomies are incontrovertibly 'in the data', that they emerge 'from the data as a consequence of their *natural properties*' [see Lakatos and Musgrave, 1970: 98]. The taxonomic view of classification is in this sense like Lévi-Straussian structuralism, in that if you try hard enough it is possible to discern the kind of order you are seeking wherever you wish. My field data (by which I understand what was written down in my notebooks, on cards, on specimen tags, in photographs and drawings, and recorded on magnetic tape) were obtained through a mixture of directive and non-directive methods. In this form they consist of fragmented, sometimes contradictory statements, and have to be 'processed', transformed into clear generalisations, tested hypotheses and descriptions. There is nothing *in* the data in this form that would suggest that a distinction between morphological and non-morphological characteristics, or between taxonomic and non-taxonomic processes, is justified, or that there exists something called 'the Nuaulu classification of animals', which the Nuaulu conceive of as some kind of structured totality. This is a construction that I have placed upon the data. Certainly, one of the properties of the Nuaulu data (as I have presented them) is that many of them permit a taxonomic construction; but they may permit others as well. The 'natural' properties referred to are ambiguous and the term contentious. I would wish to resist strongly the kind of empiricism which uncritically sees taxonomies as simply facts out there waiting to be

collected, like so many herbarium specimens. Such an approach begs crucial questions in the understanding of classification, and (ironically) its general application has only been possible through the systematic neglect of the full range of factors at work in 'classifying'. In the highly particular social world of professional biology the principle of 'taxonomic rigidity' is an important working assumption; in the context of ethnobiology it has become almost dogma [Healey, 1978–9: 379]. But you cannot work from taxonomy as if it provided a set of axioms [Hunn, 1976: 510].

8. Taxonomy as theoretical icon

A final problem, and perhaps an explanation of the tenacity with which its practitioners defend the taxonomic approach, is linked to the fact that it is not simply that taxonomy and formal elicitation have become indelibly linked to certain kinds of substantive investigations, but that 'taxonomy' has become central to, has even come to emblazon, particular theories of culture [Conklin, 1969], conceptions of ethnography [Spradley, 1979], models of thought process [Bruner *et al.*, 1956], kinds of ideology even [Fabian, 1975]. As Gay remarks [Gay, 1981: 115], though this may be a narrow scholarly refraction, 'he who discovers a taxonomy may be so thoroughly brainwashed by Aristotle that he cannot see the forest for the tree diagrams'. Put more generally, the extent to which it is appropriate to characterise a classification as 'taxonomic' is determined by culture itself. Such reification at least in part stems from a desire to provide a universal model to counter cultural relativism [Brown *et al.*, 1976]. Curiously (and paradoxically), the approach is based on the rigorous definition of cultural boundaries in order to provide the basic units for the construction of pan-human hypotheses. However, this notion of the boundedness of cultures is linked to an organic model and crude functionalist assumptions, without being genuinely sociological, systematic or contextual. This becomes readily apparent if it is compared with the treatment of classification in, say, historical linguistics and philology. In the latter, cultural boundaries disintegrate, and diffusion and historical explanation rule, and the patterns themselves *are* contingent upon particular social and cultural processes.

8.3 Besides taxonomies

While we may agree that attempts to define, rigorously, the principles of classification and nomenclature in folk biology are certainly useful for particular ethnographic populations, the making of inductive generalisations about certain types cross-culturally assumes that variability is

according to a limited number of well-understood criteria along parallel axes. The restricted check-list approach exemplified by the work of Berlin and his associates cannot, then, cope with the wider dimensions of variation between systems. It not only tends to reify a particular kind of classification (that which we call taxonomic), but seems to claim that a large number of semantic fields are at all times similarly organised. 'Taxonomy has been elevated to an artificially high status as *the* mode that humans employ to organise and act upon discrete elements in the environment' [Rosch *et al.*, 1976]. It is compelling because it is a stylish representation of relationships among natural elements *and* because taxonomising appears to us as an efficient strategy for organizing, storing and retrieving elements (especially words) in memory [see for example Ericsson *et al.*, 1980]. Even if we agree that the taxonomic mode typifies Western culture (and I am not convinced of this either), we cannot assume that other cultures have precisely the same formulations of resemblance, relationship, class and contrast [Hobart, 1982: 22]. Nevertheless, many field researchers, sceptical of the claims for an all-embracing taxonomy in human categorisation of nature, have reasonably argued in favour of a 'limited natural taxonomy', a 'non-model taxonomy' with some non-taxonomic features, or have found taxonomies a convenient descriptive framework [Gay, 1981: 128–9, Taylor 1990: 59–61, Ellen *et al.*, 1976a].

We may agree that, as one available common process, taxonomy is universally available in the classifying repertoires of all peoples. It is, however, more important in some societies than in others [see also Super *et al.*, 1977], and although the taxonomic mode is useful in describing the structure of some systems it is not entirely adequate [Hunn, 1977a: 13], and in some cases limited to particular domains [Lancy and Strathern, 1981: 780]. Thus, taxonomy works quite well for Nuaulu vertebrates (and among vertebrates for birds and reptiles), but it works less well with mammals (including bats), invertebrates and fungi. Elsewhere, although the Tobelo use non-taxonomic features 'they still seem to overwhelmingly prefer a taxonomic structure', especially below basic terms [Taylor 1990: 61].

Using procedures for testing taxonomic thought [see Bruner *et al.*, 1966], and using tests to reflect presence or absence of taxonomic thought, it has been suggested that there is a close correlation between the tendency of children to employ taxonomic-like strategies and the degree of depth and complexity of folk taxonomy in a language. Work undertaken by Lancy and Strathern [1981] in two New Guinea populations suggested that Ponam children improved their taxonomic thought with age whereas

Melpa only improved with education [p. 777]. Melpa appear to mute a taxonomising tendency as socialisation advances [p. 778] and other modes of representation are employed; in tests pairing was interpreted as blocking taxonomising. In the case of the European tradition, the taxonomic approach is firmly linked to the development of literacy and scientific culture. So, where literacy has even just a toehold (as among the Tzeltal) it cannot but help encourage taxonomic expression.

Thus, two things become abundantly clear: firstly, that the cognitive and linguistic constructs employed in classifying are varied and combined in different ways in different cultures, and, secondly, that the ways in which they are employed are exceedingly flexible. In addition to hierarchic class inclusion, folk-biological classifying activity involves indices, keys, paradigms, typologies [Conklin, 1964: 39–40], non-hierarchic binary opposition and pairing [Brown, 1979: 794–5; Lancy and Strathern, 1981: 782], simple dichotomous division, and possibly other forms as well [Tyler, 1978: 290]. We must also be prepared for categories to be expressed in different ways on different occasions in different places. Pairing, for example, may involve a wide variety of principles and these will be realised differently in different cultures: difference, duality, complementarity, alliance, hostility, equality. Similarly, pairs may be elaborated to form more complex constructs, analogies, series of paired opposites, series of vertical similarity, alternation and more complex symmetries. These basic relations in ordering social classifications are well known [Needham, 1979].

Thus items may be assigned to different categories, arranged in different ways, according to different principles depending on context. In other words, culture *enables* various forms of alternative orientations, organisations and actions; culture in this sense is a tool-kit [Salzman, 1981]. Friedberg [Friedberg, 1971] has shown this for Bunaq plant categories. For the Nuaulu, it occurs not only in terms of the allocation of certain salient terminal categories to more inclusive ones [Ellen, 1975a], but also in identification of the content of terminal categories themselves. In some cases, this can be represented as a paradigm constructed of several cross-cutting binary discriminations. I have already referred to the example presented by the Nuaulu classification of bats. Similar to this is the allocation of specimens to subdivisions of the category **kahunekete** (spider) on the basis of a series of asymmetric cross-cutting contrasts: *large : other*, *house-dwelling : other*, *black : other* and *stinging : other*. Some categories are, it is true, unique, e.g. **kahuneke hatu nohu inae** (cave scorpion spiders of the family Charontidae), in that their content is quite

specific in biological terms. But most of these categories cut across each other (such that something termed **kahuneke onate** might just as reasonably have been designated **kahuneke numa**), while they may also cut across other designations based on detailed morphology and behaviour. What is clear is that Nuaulu terms for spiders do not exhaust the classificatory space of the category **kahunekete**. However, in Nuaulu thought, they remain categories of the same classificatory and zoological status.

How these different modes are employed will vary. Taxonomy will, in certain cultures, be dominant. In some cultures styles of classification may vary between domains, perhaps even reflecting in Piagetian terms different stages of child cognitive development [Harris and Heelas, 1979: 231]; elsewhere they may vary according to situation. Thus, Nuaulu fungi (**unate**) could only be represented taxonomically at the risk of violating other demonstrably important principles. Fungi are generally (although not exclusively) named according to their host, which permits the possibility of a proxy classification which is that not of the organisms themselves but of the relations between their various hosts. But fungi differ among themselves according to other diagnostic criteria every bit as important as host. The category **kahunekete**, considered above, is likewise impossible to represent faithfully as a simple two-dimensional taxonomy. In the case of both **unate** and **kahunekete** we are clearly dealing with paradigms. In the case of the internal divisions of the category **kori-kori** (butterfly), the classification is substantially on the basis of a single character, colour, with few discriminations any more detailed than that of biological family. In this respect classification is similar to folk-English distinctions between 'whites', 'blues' and so on.

8.4 Understanding the grounds for prehension

Rather than documenting taxonomies or other kinds of classifications and categories as so many butterflies [Leach, 1961: 2], it is necessary to focus upon the processes that generate them; not detached cognitive processes, but those rooted in particular situations. To distinguish it from the arid abstraction of the notion of classification, we might call this *prehension*. Prehension refers to those processes which through various cultural and other constraints give rise to particular classifications, designations and representations. What results depends on the inputs at all stages in the process (such as elicitory techniques and so on) and the interaction of various factors. Prehension stresses the situational bias of classification, whereas *cognition* and *perception* suggest purely cerebral processes. Indeed, classification itself may be deemed too narrow a

definition of what is involved [Reason, 1979b], and too easily results in psychological reductionism, in a discussion of states of mind. Prehension recognises, without the necessity of qualification, the difficulty of distinguishing mind from matter, thinking from doing or speaking, individual from group, cerebral from social, natural from cultural. Thus, prehension entails individual acts of perception, but is not (and cannot be) confined to them. We can only begin to approach a realistic understanding of classifying behaviour if we begin by observing people assigning items to categories and using names in natural ethnographic settings, as well as experimental ones. Moreover, if we use experimental techniques which we might reasonably expect to produce particular results, we should try also to devise other techniques which might produce other, different, results.

The structure of prehension is as follows. People bring to situations in which classifying activity takes place, and from which verbal statements about classifying behaviour result, information of diverse kinds acquired through both informal and formal socialisation experience, of the world in general and of earlier classifying situations. How they then classify depends upon the interplay of this past knowledge (including prescriptions and preferences with regard to particular cognitive and linguistic idioms) with the material constraints of the classifying situation, the purposes of the classifying act, and upon the inputs of others. Thus, thinking, saying and doing are not separate activities but inter-penetrating ones, while the same cognitive bricolage provides us with both models 'of' and models 'for' in terms of Geertz's [Geertz, 1966] distinction.[1] Practical problems do not exist totally independently of all their representations, and in a very real sense all classifications are, therefore, practical (chapter 6.3).

This idea can be taken further. Whether speaking of concrete usage situations or more abstract general statements, as Perchonock and Werner [1969: 229] have pointed out, 'our data are essentially linguistic utterances, which reveal the speaker's knowledge' rather than any ability to perform adequately. 'These two domains of cultural knowledge' and cultural know-how are not independent. At least for analytic purposes, know-how presupposes cultural knowledge. But 'knowledge' itself is *socially* distributed, both in terms of the know-how it might encode – as we have seen from chapter 5 – but perhaps more significantly also in terms of the *value* placed upon it, in some instances despite suspicions as to its objective quality. The value accorded such knowledge varies with the cultural authority of those who possess it. Even though it may be widely accepted that effective know-how of the natural world varies between

individuals, this does not prevent the cultural definition of 'knowledge' as fixed and controlled by whoever constitute the *de facto* guardians of cultural knowledge. In the Nuaulu case these 'guardians' are elders in general, but particularly those in formal positions of authority (mainly clan chiefs and **kapitane**). From time to time ordinary folk may defer to such guardians to seek practical know-how, and to confirm and expand their 'knowledge of'. It is almost as if such hypothetical 'fixed' knowledge of those in authority and the know-how of lesser folk are transmitted and conserved along parallel trajectories through time, though in practice of course both are subject to constant interaction and negotiation.

There is a further important aspect of prehension. This arises from the fact that the processing and storage of information in the brain is imperfect, and communication of that information less perfect still. Paradoxically, there is an inner connection between this shortcoming and the considerable capacity of the human mind to re-order information in different ways, replacing irrelevant information with that of greater and more immediate utility. As Sperber [Sperber, 1985: 31] has remarked, 'mental representations have a basically unstable structure: the normal fate of an idea is to become altered or to merge with other ideas; what is exceptional is the reproduction of an idea'. Following Lévi-Strauss, he insists that any epidemiology of ideas is, therefore, as much concerned with transformation as with persistence. That classifications are messy, cross-cutting and changing is a reflection of this. Consider also the paradox that while the human mind always strives for order, the reality it deals with is so complex that it can never fully attain it. Concepts are often used, operationalised, without defining them. The efficient practice which precedes theory does not require self-reflection on the operation while performing it, and much infant learning is, in fact, learning *not* to think about operations which once needed to be thought about [Medawar, 1957: 138]. On the other hand, in order for communication to take place, classification must have at least some intersubjective structure, agreed cultural rules, some 'doxa' [Bourdieu, 1977].

Prehension is an inherently social process. Classifying activity may be solitary or inter-personal; that is we may wish to communicate not simply with others but with ourselves as well. But even solitary behaviour is modelled on that hypothetically occurring between individuals. In a solitary classifying act there is no communication with others, but where there is the communication usually takes the form of linguistic expression, though not necessarily verbalised. The problem is that at the point of transformation into the lexical output of language there is a fundamental

simplification of the cognitive and semantic relations. Linguistic expression necessarily entails both *decomposition* and *facilitation*; decomposition because language is unable to encode at one instance the totality of informational relations in the mind, and facilitation because that same complexity must be translated into a form which makes communication and expression possible. It is, if you like, the same as translating from the machine code of a computer, designed for the internal organisation and manipulation of information, to a programming language. Thus, it is impossible for a sender to communicate everything to a receiver. We must distinguish the intended message from the outward signs of the message and it is these latter that will vary depending on who the recipient is. Receivers will encode the message, not in terms of the intentions of the sender, but in the light of the recipient's own expectations and knowledge. Sender A may say 'X is a kind of Y', based on the unverbalised information that X and Z are types of Y, although recipient B (with no knowledge of the Y–Z relation) may interpret this statement, through his or her own experience, as a fourth item W, to imply that X (like W) is a kind of Y. There is, then, a degree of ambiguity, and people must interpret and operate with respect to the codes and outward signs of others without knowing what inner processes are taking place and the information that generates them [Wallace, 1970].

Each time a term is used in normal discourse or in thought, there is a potential shift in meaning. Sure, there are social and cognitive forces which conserve semantic value, but this is something which has to be explained rather than assumed. Each time a term is used is a fresh test of its extent and depth of reference. Stasis is not an intrinsic feature of category content, which is determined by cognitive, social (including technical) and environmental conditions. Concepts are shaped particularly by salient events and other salient concepts (which together constitute their environment). We can model change in content as we move from one event to the next:

event 1 a b c
event 2 a b c d
event 3 b c d e

... and so on

Thus, an individual's understanding of a concept is the aggregation of n memorate events, where some events are more determinate in concept formation than others. We may, therefore, agree with Reason [Reason,

n.d.: 8] that 'linguistic utterance is not generically precise at all; it is generically *sufficiently* precise'. Interpretation depends upon whether the person of the same culture interacting in a particular activity will be different from a member of the same culture but one who is not prepared by previous mutual experience. The interpretation of a non-member of the culture will be different yet again, and that of the specialist ethnographer especially so. All this will affect the degree of possible ambiguity. Interpretation will also depend upon the questions or commands of the interlocutor (recipient). For example, an individual may get from A to B according to a variety of *ad hoc* conscious and unconscious procedures, and certainly without the use of any mental map. On the other hand, if asked to draw one *post facto* there may be no problem, even though the map had no bearing on the original decision. As Reason [Reason, n.d.: 7–8] has pointed out: 'ambiguity, ambivalence, metaphorisation, are not peripheral and arcane aspects of language use, but central and essential ... It is hypostatised, reified classificatory usages which require special social conditions to obtain'. What this implies, and what I have tried to focus on in this book, is classifying (as a historically situated activity) rather than classifications. 'Classifications', says Reason in continuing the passage just quoted, 'as such are, if at all, only derivatively meaningful'. Indeed, formal representations may be positively misleading, for they purport to, but cannot, incorporate the grounds of such interpretations [c.f. Tyler, 1978: 290].

The dynamics of prehension cannot simply be understood in terms of the interplay of factors at the instance of classification or verbal expression. The outcome depends on the life experiences of the classifier: learned cultural behaviour, personal experience, adaptation and individual socialization. In this respect it is important to acknowledge the significance of materiality and the child's acquisition of that materiality. Thus, in the early development of every child, bodily discovery, experience and perceptual salience will determine a cultural dominance of *front* over *rear*, *above* over *below*, *hands* over *feet*, and so on [Clark, 1973]. Linguistically, the second item in each of these pairs will be accordingly marked. But not only does materiality affect the handling of knowledge, it affects the experience of time also. Thus, the *past* appears markedly to dominate the *future*. This is so in two senses. First, past experience has cognitive priority and is only displaced through repeated contrary cases. Secondly, temporal ordering itself serves as a basis for serial signification (as in the contrast set *older:younger*, or in birth order names).[2] Thus, overall the dominant cognitive relations brought to prehension are mater-

ial, historical and biographical, rather than non-material and contemporary.

In addition to such processes ingrained in early socialization, we must add the linguistic and classificatory idioms resulting from cultural convention; but what we must not then do is simply to accord to the mind a mechanistic model. The mind itself organises information extensively in terms of paradigms, and is an active rather than a passive system in which images are connected and constantly transformed. What is certain is that unless there is clear and explicit cultural evidence for a total unitary classification of animals, it is as unlikely to be generated subconsciously in the mind as it is to be a logical consequence of the structure of language. For Ardener [Ardener, 1989: 179–80]:

> it will be no wonder if we cannot sometimes tease out in real life whether we are dealing with a 'social' or a 'linguistic' phenomenon. Language is to the social as a measuring rod is to the measured, where, however, the inches or centimeters stretch or contract at the same time as the object itself deforms in related or independent directions.

Appendix 1 Checklist of terrestrial mammal fauna (excluding bats) recorded in the Nuaulu region of south central Seram, 1970–75

Species	Ecological zones 1	2	3	4	Nuaulu glosses
MARSUPIALIA					
Phalangeridae Phalangerinae					
Phalanger orientalis orientalis cuscus	+	+	+	–	**mara kokowe** (♂) **mara osu** (♀)
Phalanger maculatus chrysorrhous spotted cuscus	+	+	+	–	**mara makinete** (♂) **mara siha** (♀)
INSECTIVORA					
Soricidae					
Suncus murinus murinus house shrew	–	–	+	–	**kusa-kusa?**
RODENTIA					
Muridae Murinae					

Species	Ecological zones 1	2	3	4	Nuaulu glosses
Rattus rattus rattus					
house rat; black rat	–	–	+	–	**imanona**
Rattus exulans ephippium					
Pacific rat	–	–	+	–	**imanona, mnaha**
Mus musculus musculus					
common mouse; house mouse	–	–	+	–	**mnaha**
Melomys					
mosaic-tailed rat	–	+	+	–	**imanona ai ukune? mirine?**
CARNIVORA					
Canidae					
Canis familiaris					
domestic dog	–	–	+	–	**asu**
Viverridae					
Viverrinae					
Viverra tangalunga tangalunga					
the Malay civet	+	+	+	–	**lau**
Paradoxurinae					
Paradoxurus hermaphroditus setosus					
common palm civet; toddy cat	+	+	+	–	**kuha** **tui-tui**
Felidae					

Species	Ecological zones 1	2	3	4	Nuaulu glosses
Felis catus domestic cat	−	−	+	−	**mau**
PERISSODACTYLA					
Equidae					
Equus caballus horse	−	−	+	−	**naitanane**
ARTIODACTYLA					
Suidae					
Sus scrofa	+	+	+	−	**hahu**
Sus celebensis wild pig	+	+	+	−	**hahu**
Sus verrocusus ceramicus Java pig	+	+	+	−	**hahu kamutue**
Cervidae					
Cervus timorensis moluccensis	+	+	−	−	**maianane**
Bovidae					
Bos taurus/indicus domesticated cat	−	−	+	−	**korobou, sapi**
Capra aegagrus domesticated goat	−	−	+	−	**une-une**

Key. Zone 1 = above 100 metres, principally montane rain forest; Zone 2 = tropical rain forest; Zone 3 = secondary forest, garden and village areas; Zone 4 = freshwater and swamp forest.

Appendix 2 Checklist of bats (CHIROPTERA) recorded in the Nuaulu region of south central Seram, 1970–75

Species	Ecological zones 1	2	3	4	Nuaulu glosses
MEGACHIROPTERA					
Pteropodidae Pteropodinae – flying foxes					
Pteropus melanopogon melanopogon bare-backed fruit bats	?	?	+	?	**nota sapane**
Dobsonia viridis viridis	?	?	+	?	
Dobsonia moluccensis moluccensis	?	?	+	?	**nota hatu nohue** **nota maka paluwe**
Macroglossinae – long-tongued fruit bats					
Macroglossus minimus	+	+	+	–	**nota muni munte,** **nota kiniku putie**
Syconycteris crassa major	?	?	+	–	**nota muni munte,** **nota kiniku putie**
Nyctimeninae – tube-nosed bats					

Species	Ecological zones 1	2	3	4	Nuaulu glosses
Nyctimene sp.	?	+	+	–	**nota muni munte, nota kiniku putie**
MICROCHIROPTERA					
Emballonuridae Emballonurinae – sheath-tailed bats					
Emballonura nigrescens nigrescens	?	?	+	–	**notane**
Emballonura raffrayana stresemanni	?	?	+	–	**nota mana waute, nota muni munte, nota kiniku putie, nota maka paluwe**
Rhinolophidae Rhinolophinae – horseshoe bats					
Rhinolophus keyensis (?) truncatus	?	?	+	–	
Hipposiderinae – leaf-nosed bats					
Hipposideros ater saevus	?	?	+	–	**nota muni munte, nota kiniku putie, nota hatu nohue**

Notes: :*Key*. Zone 1 = above 1000 metres, principally montane rain forest; Zone 2 = tropical lowland rain forest; Zone 3 = secondary forest, garden and village areas; Zone 4 = freshwater and swamp forest.

Appendix 3 Checklist of birds recorded in and around the Nuaulu region of south central Seram, 1970–75

Species	Ecological zones 1	2	3	4	5	Nuaulu gloss
CASUARIIFORMES						
Casuariidae – cassowaries						
Casuarius casuarius	+	+	+	–	–	**asuwan**
PELECANIFORMES	–	–	–	–	+	**nusi tanane**
Sulidae – gannets and boobies						
Sula sula rubripes						
S. leucogaster plotus						
Phalacrocoracidae – cormorants						
Phalacrocorax melanoleucos						
P. sulcirostris						
Fregatidae – frigate birds						
Fregata ariel						
F. minor						
CICONIIFORMES						
Ardeidae – herons and allies	–	–	–	+	–	**sote**
Dupetor flavicollis						
prob. *Bubulcus ibis*						

Species	Ecological zones 1	2	3	4	5	Nuaulu gloss
prob. *Butorides striatus*						
prob. four species of *Egretta*						
prob. *E. garzetta*						
prob. *E. intermedia*						
prob. *E. sacra*						
prob. *Ixobrychus sinensis*						
Nycticorax caledonicus						
Phalaropididae						
Phalaropus lobatus						
Scolopacidae						
Actitis hypoleucos and others						
Threskiornithidae						
Threskiornis moluccus, white ibis	−	−	−	+	−	**moinapu**
uncertain	+	+	+	−	+	**samane**
ANSERIFORMES						
Anatidae – ducks, geese etc.						
Anas boscas, domesticated duck	−	−	+	−	−	**pepeko**
FALCONIFORMES						
Accipitridae – harriers, hawks and eagles	+	+	+	−	−	**muinu toa**
Accipiter cirrhocephalus ceramensis, *Accipter novaehollandiae* and possibly others						
Pandionidae – ospreys						
Pandion haliaetus	−	−	−	+	+	**nusi takanasi**
Falconidae – falcons						
Falco moluccensis	−	+	+	−	−	**muinu puane**
F. peregrinus						

Species	Ecological zones 1	2	3	4	5	Nuaulu gloss
GALLIFORMES						
Megapodiidae – megapodes						
Megapodius reinwardt orange-footed scrubfowl	–	+	+	–	–	**kinosane**
M. wallacei Moluccas scrub hen	–	+	+	–	–	**muma**
Phasianidae – quails and pheasants						
Coturnix chinensis lineata, Chinese quail	–	–	+	–	–	**kowe marae (♂), kowe metene (♀)**
Gallus gallus, domesticated fowl	–	–	+	–	–	**man tulalakane (♂), man winai (♀)**
GRUIFORMES – rails and related forms	–	+	–	+	–	**sote nakone**
Amaurornis olivaceus						
Gallinula tenebrosa						
Poliolimnas cinereus						
Porphyrio porphyrio						
Porzana pusilla						
Rallus philippensis						
prob. *Rallina? fasciata*						
CHARADRIIFORMES						
Charadriidae – plovers	–	–	–	+	+	**hiko-hiko**
Charadrius leschenaultii						
C. mongolus						
poss. *Squatarola dominicus*						
Laridae – gulls and terms						
Chlidonias hybridus, marsh tern	–	–	–	+	–	**nusi kiene**

Species	Ecological zones 1	2	3	4	5	Nuaulu gloss
Sterna bergii	–	–	–	+	–	**nusi onate**
other terns at least three species of *Sterna*	–	–	–	–	+	**nusi puane, nusi seane**
COLUMBIFORMES						
Columbidae – pigeons and doves						
Macropygia amboinensis, Amboina cuckoo-dove prob. *Gymnophaps mada*, long-tailed mountain pigeon	–	+	+	–	–	**puane**
Ducula bicolor, white nutmeg imperial pigeon	–	+	+	–	–	**hutiene, manu pake**
Reinwardtoena reinwardtii, great cuckoo dove						
PSITTACIFORMES						
Psittacidae – lories, parrots and cockatoos						
Lorius domicella, black-capped or purple-naped lory also *Micropsitta bruijnii*	–	+	+	–	–	**kihoke**
Cacatua moluccensis, Moluccan cockatoo *Cacatua galerita*	–	+	+	–	–	**nakatua (putie)**
Eclectus roratus, red-sided eclectus parrot	–	+	+	–	–	**wekae msinae**
Tanygnathus megalorhynchos, Moluccan or island parrot	–	+	+	–	–	**konane**
various Lories, including *Eos semilarvata*,						

Species	Ecological zones 1	2	3	4	5	Nuaulu gloss
blue-eared lory *E. squamata* poss. *Charmosyna placentis* *E. bornea*, and possibly other related species	−	+	+	−	−	**wekae marae**
Alisterus amboinensis, Amboinan king parrot	−	+	−	−	−	**siseite**
Geoffroyus geoffroyi, red-cheeked parrot	−	+	+	−	−	**tuie**
CUCULIFORMES						
Cuculidae – cuckoos						
Cuculus saturatus, oriental cuckoo	−	−	+	−	−	**kukue**
Cuculus variolosus, grey-breasted brush cuckoo two species of *Chalcites* *Eudynamys scolopacea orientalis*, Indian koel *Scythrops novaehollandiae*, channel-bill cuckoo						
Centropus bengalensis medius, lesser coucal	−	−	+	−	−	**suanane**
STRIGIFORMES						
Strigidae – owls						
Otus magicus	−	+	+	−	−	**tuku-tuku**
Ninox squamipila	−	+	+	−	−	**sakoa**

Species	Ecological zones 1	2	3	4	5	Nuaulu gloss
CAPRIMULGIFORMES						
Caprimulgidae – nightjars						
Caprimulgus macrurus, large-tailed nightjar	–	+	+	–	–	**kuna-kuna**
uncertain	–	+	+	–	–	**man totane**
APODIFORMES						
Hemiprocnidae						
Hemiprocne mystacea confirmata						
Apodidae – swifts						
Collocalia esculenta esculenta, glossy swiftlet	–	+	+	–	–	**sioi, kina nahane, neune anae**
Collocalia spodiopygia ceramensis						
CORACIIFORMES						
Alcedinidae – kingfishers						
Halcyon sancta, sacred kingfisher	–	–	+	+	–	**tialapeti**
uncertain, perhaps *Halcyon chloris*	–	+	+	–	–	**mui numte**
Halcyon lazuli						
Ceyx lepidus, dwarf kingfisher	–	+	+	+	–	**man tuamane**
Tanysiptera galatea, common paradise kingfisher	–	–	–	+	–	**saneane**
also *Ceyx*						
Alcedo atthis hispidoides						
Bucerotidae – hornbills						
Rhyticeros plicatus Papuan hornbill	–	+	–	–	–	**sopite**

Species	Ecological zones 1	2	3	4	5	Nuaulu gloss
PASSERIFORMES						
Pachycephalidae – shrike flycatchers and whistlers	–	+	+	–	–	**soihihi**
Pachycephala pectoralis golden whistler						
Sturnidae – starlings incl. *Basilornis corythaix*, long-crested myna						
Aplonis metallica						
A. mysolensis forsteni						
Dicruridae – drongos	–	+	+	–	–	**tika poho-poho**
Dicrurus bracteatus						
Corvidae – crows	–	–	+	+	–	**tika poho-poho, opor**
Corvus enca violaceus						
Nectariniidae – sunbirds						
Nectarinia aspasia	–	+	+	–	–	**tinnanae**
prob. *N. jugularis clemetiae*						
Meliphagidae – honey eaters						
Philemon subcorniculatus, Seram friar bird	–	–	+	–	–	**kinoke**
Lichmera monticola, Seram honey eater						
uncertain perching birds						**katenane**
	–	–	+	–	–	**suite**
						sopate
	–	+	+	–	–	**hiru**

Species	Ecological zones 1 2 3 4 5	Nuaulu gloss
uncertain birds of all orders		**manu kasa neane kura-kura**

Key. Zone 1 = above 1000 meters, principally montane rain forest; zone 2 = tropical lowland rain forest; zone 3 = secondary forest, garden and village areas; zone 4 = freshwater and swamp forest; zone 5 = birds of the sea and littoral.

Appendix 4 Checklist of testudines recorded for the Nuaulu area of south central Seram, 1970–75

Species	Ecological zones 1	2	3	4	5	Nuaulu glosses
CHELONIA						
Emydidae – freshwater turtles						
Cuora amboinensis Amboinan box terrapin	–	–	–	+	–	**peku**
Cheloniidae – sea turtles						
Dermochelys coriacea leatherback turtle	–	–	–	–	+	**enu ikae**
Eretmochelys imbricata hawksbill turtle	–	–	–	–	+	**enu hunane**
Chelonia mydas green turtle	–	–	–	–	+	**enu hunane**
Caretta caretta	–	–	–	–	+	**enu hunane**

Key. Zone 1 = above 1000 m, principally montane rain forest; zone 2 = tropical lowland rain forest; zone 3 = secondary rain forest, garden and village areas; zone 4 = freshwater and swamp forest; zone 5 = marine and estuarine.

Appendix 5 Checklist of lizards and related forms recorded for the Nuaulu area of south central Seram, 1970–75

Species	Ecological zones 1	2	3	4	5	Nuaulu glosses
CROCODILIA						
Crocodylidae						
Crocodylus porosus estuarine crocodile	–	–	–	+	+	**puha**
SAURIA						
Gekkonidae – geckos						
Hemidactylus frenatus	–	–	+	–	–	**imasasae numa**
common house gekko *Gekko vittatus*	–	–	+	–	–	**imasasae ai ukune**
Agamidae – dragon lizards						
Calotes cristatellus	–	–	+	–	–	**kasa'un**
Draco lineatus amboinensis	–	–	+	–	–	**hohone**
Hydrosaurus amboinensis	–	–	+	+	–	**isa**

Species	Ecological zones 1	2	3	4	5	Nuaulu glosses
Varanidae – monitors						
Varanus indicus water monitor	–	–	+	+	–	**puo**
Scindidae – skinks						
Tiliqua gigas	–	–	+	–	–	**nopa inae**
Mabuya multifasciata many-banded skink	–	–	+	–	–	**poso hoha kunie**
Mabuya 'rudis'	–	–	+	–	–	**poso ai totu kopue** **poso noha metene**
Carlia fusca	–	–	+	–	–	**poso ai totu kopue**
Carlia sp. (prob. *fusca*)	–	–	+	–	–	**poso ai totu kopue**
Dasia smaragdina moluccarum	–	–	+	–	–	**poso kaimarane**
Emoia cyanura	–	–	+	+	–	**poso kaimarane**
Emoia kuekenthali notomoluccensis	–	–	+	–	–	**poso kaimarane**
Eugongylus rufescens	–	–	+	–	–	**nopa hanaie**

Key. Zone 1 = above 1000 meters, principally montane rain forest; zone 2 = tropical lowland rain forest; zone 3 = secondary rain forest, garden and village areas; zone 4 = freshwater and swamp forest; zone 5 = marine and estuarine.

Appendix 6 Checklist of snakes recorded in the Nuaulu region of south central Seram, 1970–75

Species	Ecological zones 1	2	3	4	5	Nuaulu glosses
Typhlopidae – worm snakes						
Typhlops braminus	–	?	–	–	–	**take tuamana**
Typhlops kraali	–	?	–	–	–	**teke tuamana**
Typhlops ligorostris	–	?	–	–	–	**teke tuamana**
Ramphotyphlops multilineatus	–	?	–	–	–	**teke tuamana**
Boidae – pythons and boas						
Morelia amethistina amethystine python	?	+	+	–	–	**teke soata**
Python reticulatus reticulated python	?	+	+	–	–	**teke patona**
Candoia carinata Pacific boa	–	+	+	–	–	**mainase**
Colubridae – colubrid snakes (harmless)						
Dendrelaphis pictus pictus	–	+	+	–	–	**teke tam niane, teke konomete**
colubrid snakes (mildly venomous)						
Boiga irregularis banded tree snake	–	+	+	–	–	**teke panarine**
Chrysopelea rhodopleuron	–	?	–	–	–	**teke msinae**

Species	Ecological zones 1	2	3	4	5	Nuaulu glosses
freshwater snakes						
Fordonia leucobalia	−	−	−	+	−	**teke waene**
Cerberus rhynchops	−	−	−	+	−	**teke waene**
Elapidae – elapid snakes						
Acanthophis antarcticus antarciticus	−	+	+	−	−	**nanate**
death adder						
Aspidomorphus muelleri	−	+	+	−	−	**?nanate**
sea snakes						
Laticauda colubrina	−	−	−	−	+	**teke nuae**
Laticauda laticauda	−	−	−	−	+	**teke nuae**

Key. Zone 1 = above 1000 meters, principally montane rain forest; zone 2 = tropical lowland rain forest; zone 3 = secondary rain forest, garden and village area; zone 4 = freshwater and swamp forest; zone 5 = marine and estuarine.

Appendix 7 Checklist of amphibians recorded in the Nuaulu region of south central Seram, 1970–75

Species	Ecological zones					Nuaulu glosses
	1	2	3	4	5	
Pelodryadidae						
Litoria infrafrenata	–	+	+	+	–	**poro-poro, notu**
Litoria amboinensis	–	+	+	+	–	**notu, inararai**
Litoria sp. (*bicolor* group)	–	+	+	+	–	**notu anae**
Ranidae						
Platymantis papuensis	–	+	+	+	–	**notu, kere, teteye**
Rana modesta	–	–	–	+	–	**notu, kere**
Rana sp.	–	+	+	+	–	**notu**
Microhylidae						
Phrynomantis fusca	–	+	+	+	–	**notu, kako**

Key. Zone 1 = above 1000 meters, principally montane rain forest; zone 2 = lowland tropical rain forest; zone 3 = secondary forest, garden and village areas; zone 4 = freshwater and swamp forest; zone 5 = marine and estuarine.

Appendix 8 Checklist of fishes and marine mammals recorded in and around the Nuaulu region of south central Seram, 1970–75

Species	Ecological zones 1	2	3	4	5	Nuaulu glosses
LAMNIFORMES – sharks	–	–	–	+	+	**woku**
typical sharks	–	–	–	+	+	**woku ikae**
Sphyrnidae – hammerhead sharks						
Sphyrna sp.	–	–	–	+	+	**woku sanihuhue**
MYLIOBATIFORMES						
Dasyatidae – stingrays						
Dasyatis kuhli	–	–	–	–	+	**hari**
PRISTIFORMES						
Pristidae – sawfish						
Pristiopsis sp.	–	–	–	–	+	**woku karakaiya**
CLUPEIFORMES						
Engraulidae – anchovies						
Thrissina baelama	–	–	–	+	–	**ama-ama**
Stolephorus spp.	–	–	–	+	–	**ika siori**
Dussumieriidae						
Spratelloides delicatulus	–	–	–	+	–	**ika mate seran**
Clupeidae – herrings						
Clupea schrammi	–	–	–	+	–	**mate**
Clupea stereolepsis	–	–	–	+	–	**mate**
Clupea longiceps	–	–	–	+	–	**mate inae**

Species	Ecological zones 1	2	3	4	5	Nuaulu glosses
Sardinella fimbriata						
Esocidae – pikes						
Ophiocephalus striatus	+	–	–	–	–	**petie**
Ophiocephalus micropelties						
	+	–	–	–	–	**petie wae nosite**
	+	–	–	–	–	**peti kunie**
CYPRINIFORMES						
Cyprinidae – carps	+	–	–	–	–	**ika timanne**
SILUROIDIFORMES						
Plotosidae – catfish eels						
Paraplotosus albilabris						**wotu-wotu**
Plotosus anguillaris						
Various freshwater catfish	+	–	–	–	–	**namue**
	+	–	–	–	–	**nam hosu**
	+	–	–	–	–	**nam wanae**
ANGUILLIFORMES – eels and morays						
Anguillidae – freshwater eels						
Anguilla bicolor pacifica	+	–	–	–	–	**awane**
Anguilla celebensis						
Anguilla marmorata	+	–	–	–	–	**awane tunne**
	+	+	–	–	–	**ika koa totue**
Muraenidae – moray eels						
Siderea picta	–	–	+	+	–	**yapato**
Muraena spp. and other spp.	–	–	+	+	–	
BELONIFORMES						
Belonidae – needlefish						
Strongylura	–	–	–	+	+	**sonu**
Tylosurus	–	–	–	+	+	**sonu**
Hemiramophidae – halfbeaks, garfish						
Hemiramphus marginatus	–	–	–	+	+	**wanu**

Species	Ecological zones 1	2	3	4	5	Nuaulu glosses
Zenarchopterus – river garfish	+	+	–	–	–	**wanu**
Various saltwater genera	–	–	–	+	–	**wanu**
Exocoetidae – flying fish						
Cypselurus spp.	–	–	–	+	–	**(ika) keuro**
GADIFORMES						
Bregmaceros macclellandi						
PLEURONECTIFORMES – flatfish						
Unidentified flatfish	+	–	–	–	–	**ika rina**
SYNGNATHIFORMES						
Fistularidae – cornet fish						
Fistularia petimbo						
Syngnathidae – pipefish, sea horses						
Hippocampus polytaenia	–	–	+	+	–	**peskada**
MUGILIFORMES						
Sphyraenidae – barracudas						
Sphyraenella chrysotaenia	–	–	–	+	+	**taniri**
Mugilidae						
Mugil troscheli	+	–	–	–	–	**hoi waene**
	–	–	–	+	+	**hoi nuae**
Atherinidae – silversides						
Pranesus duodecimalis						
Melanotaenidae – rainbowfish	+	–	–	–	–	**hoi manikate**
PERCIFORMES						
Scombridae – mackerels						
Rastrelliger spp.	–	–	–	+	–	**lema**
Scomberomoridae						
Scomberomorus						**taniri**

Species	Ecological zones 1	2	3	4	5	Nuaulu glosses
Thunnidae – tunas and albacores						
Auxis thazard	–	–	–	+	+	**komu**
Thynnus albacares						
Katsuwonus pelamis						
Kishinoella tonggol	–	–	–	+	–	**pia**
Euthynnus						
Istiophoridae – sailfish and related forms						
Istiophorus orientalis	–	–	–	+	+	**ika nane**
Xiphiidae – swordfish	–	–	–	–	+	**woku sonu**
Trichiuridae – cutlass fish						
Trichiurus haumela	–	–	–	+	–	**tumane-maine**
Carangidae – jacks, scads and pompanos						
Selaroides leptolepsis	–	–	–	+	–	**ika hutua onate**
Caranx spp.	–	–	–	+	–	**heti**
Alepes mate	–	–	+	+	–	**heti**
prob. *Alectis* sp.						
Decapterus macrosoma	–	–	–	+	–	**momar**
Lutjanidae – snappers						
Lutjanus fulviflamma	–	–	–	+	–	**ika ka**
Lutjanus rufolineatus	–	–	–	+	–	**ikae msinae, ika iloru**
Lutjanus sanguineus	–	–	–	+	–	**ika mala**
Caediodidae						
Caesio spp.	–	–	–	+	–	**ika uri hatae**
Theraponidae – tiger fish						
Therapon	–	+	–	+	–	**ika kutulauno**
Mullidae						
Unidentified goatfish	–	–	–	+	–	**ika uri hatae**
Pempheridae						
Pempheris sp	+	–	–	–	–	**eta-eta**
Chaetodontidae – butterfly fish, coral fish	–	–	+	–	–	**ikae kori-kori**
Heniochus acuminatus	–	–	+	–	–	**ikae hanu totue**
Coridae – wrasses, rainbowfish						

Species	Ecological zones 1	2	3	4	5	Nuaulu glosses
Cheilinus spp.	–	–	+	–	–	**punu**
Stethojulis kalosoma	–	–	–	+	–	**sunu moti**
unident, wrass	–	–	+	–	–	**ika tuyo hutan**
Scaridae – parrotfishes						
Callyodon or *Scarus*	–	–	–	+	+	**ika nakatua**
Blenniidae – blennies	–	–	+	–	–	**ika lasiato**
Acanthuridae – surgeon fish and related forms						
Acanthurus lineatus	–	–	+	–	–	**ika hanu totue**
Gobiidae – gobies						
Papagobiodon echinocephala	–	–	+	–	–	**ika lasiato**
Periophthalmidae – mudskippers						
Periophthalmus vulgaris	–	+	–	–	–	**lasiato**
Scorpaenidae – scorpion fish and rock fish						
Parascorpaena maculipinnis	–	–	+	–	–	**ika sinatane**
Percidae – perches						
Anabas testudineus – climbing perch	–	+	–	–	–	**ika sa sahune**
Lactaridae						
Lactarius lactarius	–	–	–	+	–	**lema**
TETRODONTIFORMES						
Diodontidae – porcupine fish	–	–	–	+	–	**ika tunene**
Diodon						
Balistidae – trigger fish and file fish						
Balistes spp.	–	–	+	–	–	**ikae uro, ikura**
Monocanthidae						
Tetraodontidae						
	–	–	–	+	+	**sunu**

Species	Ecological zones 1	2	3	4	5	Nuaulu glosses
Unidentified						
TELEOSTOMI (bony fish)	+	–	–	–	–	**wanapoi**
	–	–	+	–	–	**ika moti atue**
	+	–	–	–	–	**ika ai hata kopue**
	+	–	–	–	–	**monosia**
Aquatic mammals						
CETACEA						
whales	–	–	–	–	+	**ika baus**
dolphins and porpoises	–	–	–	–	+	**ika hahu**
SIRENIA						
Dugong dugon	–	–	–	+	–	**mata luyun**

Key: Zone 1 = freshwater; zone 2 = brackish water, mangrove swamp; zone 3 = littoral, reefs and rock pools; zone 4 = offshore; zone 5 = deep sea.

Appendix 9 Checklist of insects recorded in the Nuaulu region of south central Seram, 1970–75

Species	Ecological zones 1	2	3	4	5	Nuaulu glosses
ODONATA – dragonflies and damselflies of indet. spp.	–	–	–	+	–	**makasisi popole marae**
	–	–	–	+	–	**makasisi popole metene**
	–	–	–	+	–	**makasisi popole pokotuene**
ANISOPTERA – dragonflies						
Orthetrum villosovittatum	–	–	–	+	–	**makasisi popole msinae**
ZYGOPTERA – damselflies						
Protoneuridae						
Nositicta sp.	–	–	–	+	–	**makasisi popole masikune**
DERMAPTERA – earwigs	–	+	–	–	–	**uri usue**
ORTHOPTERA						
Mantidae – praying mantids						
Hierodula sp.	+	+	–	–	–	**kau nimunone, kau kahe kamane**
Tenodera australasiae	–	+	+	–	–	**kau (mam) kahe kamane**

Species	Ecological zones 1	2	3	4	5	Nuaulu glosses
Blattidae – cockroaches						
Periplaneta australasiae	+	–	–	–	–	**matamaine**
?*Periplaneta* sp.	+	–	–	–	–	**matamai re'unosu**
						matamai putie
Periplaneta americana						
Panesthidae						
indet. nymph	–	+	+	–	–	**kinahorake (inae)**
Phasmidae – stick and leaf insects	+	+	+	–	–	**kau ai otoe metene**
(*Hierodula* sp.)?	+	+	+	–	–	**kau ai otoe marae**
Xestophyrs sp.	–	+	+	–	–	**kauke**
indet. sp.	–	+	+	–	–	**kau ai otoe**
Platycrana viridana	–	+	+	–	–	**kau ai otoe**
Tettigonidae – bush crickets						
indet. sp.	+	+	+	–	–	**kau hatane**
Salomona marmorata ceramica	+	+	+	–	–	**kau nimunone**
Phyllophora bidentata	+	+	+	–	–	**kau kapine**
Hexacentrus sp.	–	+	+	–	–	**kau nesate**
Sexara coriacea	–	+	+	–	–	**kau suto**
indet. spp.	–	+	–	–	–	**kau kasipi totue,**
						kau putie
Gryllidae – crickets						
Cardiodactylus novaeguineae	–	+	–	–	–	**kinapari**
Gryllotalpidae – mole crickets						
Teleogryllus consimilis	–	+	+	–	–	**kau tuaman anoe**
Gryllacrididae						
Gryllaocris sp.	–	–	+	–	–	**kau suto**
Acrididae – locusts or short-horned grasshoppers						
Valanga nigricornis						**kau nimunone**
	–	+	+	–	–	**kau nuhune (kau Matoke)**
indet. spp.	+	+	+	–	–	**kau hatu tinaie**
	–	+	–	–	–	**kau suenie**
ISOPTERA – termites	+	+	+	–	–	**tananae, tananae inae**

Species	Ecological zones 1	2	3	4	5	Nuaulu glosses
Eutermes amboinensis						
Captotermes sp.						
Microcerotermes amboinensis						
ANOPLURIDA – sucking lice						**utu**
Haemotopinus suis apri – pig louse (*Sus scrofa*)	–	–	–	–	+	**hahu utue (hahu'tue)**
Pediculus humanus	–	–	–	–	+	**utu**
HEMIPTERA – true bugs						
Scuttellerida						
Tectocoris diophthalmus	–	+	+	–	–	**rikune, riku anae,**
	–	+	+	–	–	**riku pate, riku hanaie**
Calliphora billardierii	–	+	+	–	–	**kina puku paine**
Cantao ?rudis	–	+	+	–	–	**kapetite anae**
Pentatomidae – stink bugs						
prob. *Oncomeris* (Tessanataminae)	–	+	+	–	–	**rikune, rikune anae**
Flatidae						
Euphanta monoleuca	–	+	+	–	–	**rikune**
Coreidae – squash bugs						
Mictis amboinensis	–	+	+	–	–	**rikune**
Mictis profana	–	+	+	–	–	**riku wesie**
Pyrrhocoridae – firebugs						
Dysdercus singulatus	–	+	+	–	–	**makarota pina msahane**
indet. sp.	–	+	+	–	–	**kinapopote**
Acanthiidae						
Cimex sp. – bed bug						
Tesseratomidae						
Plisthenes merianae	–	+	+	–	–	
Nogodinidae						
Papuana huebrieri	–	+	–	–	–	**kitoe**
Mindura sp	–	+	–	–	–	**kitoe**
Physomenus grossipes	–	+	–	–	–	**kitoe**
Aspidomorpha areata	–	+	–	–	–	**kitoe**
HOMOPTERA						
Cicadidae						
Baeturia sp.	–	+	+	–	–	**sisie, sisie putie**

Species	Ecological zones 1	2	3	4	5	Nuaulu glosses
Platypleura sp.	–	+	+	–	–	**hana–hana**
(Dandubia) sp.	–	+	+	–	–	**nai**
indet.	+	+	+	–	–	**sisie numan, sisie kauke**
Fulgoridae						
Birdantis sp.	–	+	+	–	–	**kau tuamane anoe, tananae inae**
Gerridae						
immature sp. – pond skater	–	–	–	+	–	**sa sahune**
NEUROPTERA – lacewing flies						
Myremeleonidae						
Myrmeleon sp.	–	+	+	–	–	**makasisi popole**
COLEOPTERA – beetles						
Aspidomorpha creata	–	+	–	–	–	
Lymexylidae						
Atractorcerus sp.	–	+	+	–	–	**kunte inae**
Elateridae – click beetles						
Lanelalus insularis	–	+	+	–	–	**ka(u)petite**
Agrynus resectus						
Buprestidae – metallic wood-borers						
Chrysodema sp.	–	+	+	–	–	**riku pate**
Chrysodema malacca						
Coccinellidae – ladybirds						
Coccinella repanda	+	+	+	–	–	**hite anae**
Anobiidae						
Anobium sp. – woodworm	+	+	+	–	–	**susine**
Lucanidae – stag beetles						
Lucanus sp.	–	+	+	–	–	**atori (nione)**
Scarabaeidae – scarab beetles						
Glycyphana perridis	–	+	+	–	–	**hite, kinapuku paine**
Oryctes rhinoceros – rhinoceros beetle	–	+	+	–	–	**atori (nione), sinne inae**
Cerambycidae – long-horned beetles						
Gnoma giraffa	–	+	+	–	–	**kamanahu metene**
Gnoma zonaria						

Species	Ecological zones 1	2	3	4	5	Nuaulu glosses
Glenea corona	−	+	+	−	−	**kamanahu putie**
Glenea sp.						
Mulciper linnaei	−	+	+	−	−	**kamanahu, sinne inae**
Hexamitodera semivelutina	−	+	+	−	−	**susine**
Coptocerus biguttatus	−	+	+	−	−	**susine**
Chrysomelidae – leaf beetles						
Altica sp.	−	+	+	−	−	**kinapopo(te) inae kinapopote (marae)**
Glyciphanax sp.						
Lampyridae – fireflies	+	+	+	−	−	**kinapopote**
Anthribidae						
Xenocerus semiluctuosus	+	+	−	−	−	**rikune ari ai kanapua**
Xenocerus sp.	+	+	−	−	−	**kinoi (metene)**
Curculionidae – weevils						
Rhynochophorus bilineatus	−	+	−	+	−	**kinapukune**
Rhynochophorus ferrugineus						
Calandra oryzae – rice weevil	+	−	−	−	−	**kinapukune anae**
Calandra granaria						
Passalidae						
Labienus moluccanus	+	+	+	−	−	**kinapari**
indet. (prob. *Podops* sp.)	−	+	+	−	−	**rikune, riku ai ukune**
HYMENOPTERA						
Formicidae–Myrmicidae – ants	−	+	+	−	−	**kinawerie**
	+	+	+	−	−	**muna usite**
	−	+	+	−	−	**kumte**
	+	+	+	−	−	**sohone**
Odontomachus simillimus	+	+	+	−	−	**isanone**
Solenopsis germinata						
Dolichoderus thoracicus	+	+	+	−	−	**isanon metene isanon msinae**

Species	Ecological zones 1	2	3	4	5	Nuaulu glosses
Monomorium spp.	+	+	+	–	–	**uane utue**
Vespidae						
Ropalidia sp. – double-bodied wasp	+	+	+	–	–	**imanine (inae)**
Sphecidae – digger wasps						
Sphex sp.	+	+	+	–	–	**sene nan**
Eumenidae						
Eumenes – potter wasp	+	+	–	–	–	**sene tuamane**
Apidae – honey bees	–	+	+	–	–	**inae kilalante**
Apis indica						
Apis dorsata						
Apis florea						
Apis cerana						
LEPIDOPTERA – butterflies and moths						
Cossidae						
Duomitus ceramicus	–	+	+	–	–	
Morphidae						
indet.	–	+	+	–	–	**kori-kori marae**
Pyralididae – flour and meal moths						
Parotis sp.	+	+	+	–	–	**marane tina totue**
Papilionidae – swallow-tails and apollos						
Papilio fuscus	+	+	+	–	–	**kori-kori metene,**
	+	+	+	–	–	**kori-kori nika pante**
Papilio ulysses						
Papilio alcidinus						
Papilio lorguinionas						
Pachliopta polydorus	–	+	+	–	–	**kori-kori nika pante**
Arctiidae						
Maenas maculifascia	–	+	+	–	–	
indet. Lithosiinae						**kinopopote**
Noctuidae						
Lyssa docile	–	+	+	–	–	**kori-kori inahai**
						kori-kori uri
Danaidae						
Danaus juventa	+	+	+	–	–	**kori-kori metene**
Eupoea						

Species	Ecological zones 1	2	3	4	5	Nuaulu glosses
Nymphalidae						
Inachis						
Lycaenidae	+	+	+	–	–	**kori-kori marae**
small *Lycaena*						
Dendorix ceramensis						
Arhopala ate						
Uraniidae						
Nyctalemon agathyrsus						
Pieridae						
Aporia crataegi						
Danaideu						
Priamus						
Helana						
Parthenos var *brunea*						
Alimena						
Erionata thrax	–	+	+	–	–	**kori-kori ikine**
Hypolimnas pandanus	–	+	+	–	–	**kori-kori metene**
Troides oblongmaculatus	–	+	+	–	–	**kori-kori (onate)**
Graphium codrus	–	+	+	–	–	**kori-kori onate**
indet.	+	+	–	–	–	**inahai**
Kallima pylarchus						
Sphingidae – hawkmoths						
Geometridae						
indet.	–	+	+	–	–	**kori-kori marae**
DIPTERA – two-winged flies						
Tipulidae – crane flies	+	+	+	–	–	**kunte inae**
Culicidae – mosquitos	–	–	–	+	+	**kunte**
Anopheles farauti moluccensis						
Anopheles (Myzomia) punctulatus						
Culex incl. *ceramensis*						
Tabanidae – horse flies						
Tabanus sp. (*fumipennis* group)	+	+	–	–	–	**imanane**
Tabanus sp. (nr. *furunculigenus*)						
Asilidae – robber flies						
Laphria sp.	+	+	–	–	–	**sene nanan**

Species	Ecological zones 1	2	3	4	5	Nuaulu glosses
indet. sp.	+	+	–	–	–	**kinawerie inae**
Syrphidae – hover flies						
Allograpta sp.						
Drosophilidae – small fruit flies						
Drosophila ananassae	+	+	+	–	–	**mumne mum anae**
Trypetidae	+	+	+	–	–	**mumne**
Micropezidae						
Muscidae						
Musca domestica	+	–	–	–	–	**imanane**
Orthellia timorensis	+	–	–	–	–	**inapone (marae)**
Calliphoridae – blow flies	+	+	+	–	–	**atinotoe**
Niriidae						
Nerius (?)nigrofuscus	+	+	+	–	–	**uri usue, kumte inae**
Nerius sp.						
indet. small flies	+	+	+	–	–	**sohane inae**
SIPHONAPTERA						
Pulex irritans – human flea	–	–	–	–	+	**utu**
indet. insect	+	+	+	–	–	**monote inae**
indet. small mites	+	+	–	–	–	**nione inae**

Key. Zone 1 = village; zone 2 = cultivated areas; zone 3 = forest; zone 4 = freshwater, including sago swamp; zone 5 = zooparasites.

N.B. For terms for caterpillars, grubs and maggots (which are included in the total count for insect categories) see Ellen, 1993.

Appendix 10 Checklist of molluscs recorded in the Nuaulu region of south central Seram, 1970–75

Species	Ecological zones			Nuaulu glosses
	1	2	3	
AMPHINEURA – chiton				
	+	–	–	
GASTROPODA				
PROSOBRANCHIA – mostly marine spiral shells				
Conus g. lividus	+	–	–	**nunu ai otoi**
Conus cf. pertusus	+	–	–	**nunu ai otoi**
Conus cf. monachus	+	–	–	**nunu ai otoi**
Trochus tenebrica	+	–	–	**nunu inanaie**
Trochus niloticus	+	–	–	**nunu iwa**
Trochus flammulatus	+	–	–	**nunu iwa, nunu inanaie**
Trochus costatus	+	–	–	**nunu inanaie**
Turbo setosus	+	–	–	**nunu hihikuro**
Turbo argyrostomus	+	–	–	**nunu hihikuro**
Lunella coronatus	+	–	–	**nunu mata ipole hanaie**
Turbo porophyrites	+	–	–	**nunu mata putie**
Angaria lacinatus	+	–	–	**nunu mata ipole pina**

Species	Ecological zones 1	2	3	Nuaulu glosses
Drupa morum	+	–	–	**nunu unie, nunu hihikuro, nunu tapako**
Drupa spathulifera	+	–	–	**nunu tapako**
Murex tribulus	+	–	–	**nunu unie**
Septaria sanguisaga	–	+	–	**nunu wenate**
Septaria sp.	+	–	–	**nunu hua inate**
Cypraea arabica	+	–	–	**nunu hun**
Cypraea carneola	+	–	–	**nunu hun**
Cypraea lynx	+	–	–	**nunu hun**
Clypeomorus subbrevicula	+	–	–	**nunu oiro**
Clithon angulosa	+	–	–	**nunu tari**
Clithon(?) subsulcata	+	–	–	**nunu marane**
Latirus turritus	+	–	–	**nunu sesu nuae**
Barbatia fusca	+	–	–	**nunu hua inate, nunu katenane, nunu wae inate**
Thiara amarula	+	–	–	**nunu saun kanie**
Pisania sp. cf. crenilabrum	+	–	–	**nunu asu meie**
PULMONATA – land and freshwater snails				
Chloritis mima	–	+	–	**nunu kinihane**
Chloritis ungulina	–	+	–	**nunu kinihane**
Neritodryas cornea	–	+	–	**nunu marane**
Nerita antiquata	–	+	–	**nunu marane**
Achatina fulica	–	–	+	**nunu keon**
Amphidromus(?)	–	–	+	**nunu weri-weri**
Nanina citrina	–	–	+	**nunu kinihane**
Nania aulica	–	–	+	**nunu kinihane**

Species	Ecological zones 1	2	3	Nuaulu glosses
Melanoides (?) granifera	−	+	−	**nunu saun kanie**
Melanoides (?) punctata	−	+	−	**nunu sesu waene**
Melania hastula	−	+	−	**nunu sesu waene**
Paludina	−	+	−	**nunu sesu waene**
Vivipara javanica	−	+	−	**nunu sesu waene**
PELECYPODA – mainly bivalves				
Remis sp.	+	−	−	**nunu mara nanate**
Remis (Corbicula) sp.	+	−	−	**nunu kakante**
Tridachnes elongata	+	−	−	**nunu kakante**
Tridacna maxima	+	−	−	**nunu moi ika**
Periglypta reticulata	+	−	−	**nunu moi ika**
Ostrea spp.	+	−	−	**nunu inae**
Saccostrea cucullata	+	−	−	
Pinctada maxima	+	−	−	
	+	−	−	**nunu sikewe aie**
CEPHALOPODA				
Nautilus pompilius and prob. other species (*tenuis, major*) – squid	+	−	−	**nakatua saha**
Loligo edulis – cuttlefish	+	−	−	**sonto, sonto hatu**
Sepia pharaonis – octopus	+	−	−	
Octopus aegina	+	−	−	**urita**
Cistopus indicus	+	−	−	

Key. Zone 1 = marine; zone 2 = freshwater; zone 3 = terrestrial.

Appendix 11 Checklist of Crustacea recorded in the Nuaulu region of south central Seram, 1970–75

Species	Ecological zones 1	2	3	Nuaulu gloss
THORACIDA – barnacles	+	–	–	**nunu purai** [see appendix 10]
DECAPODIDA				
NATANTIA[1] – shrimps and prawns				**mitane**
Generic term for freshwater prawns	–	+	–	**mita waene**
e.g. *Caridina nilotica*				
Various freshwater prawns of	–	+	–	**mita sanane**
the families Palaemonidae,	–	+	–	**mita hanapakue**
Atyidae and Parastacidae	–	+	–	**mita sepa**
Macrobrachium australe	–	+	–	**mita oane**
Macrobrachium australe	–	+	–	**mita pina**
Macrobrachium sp.	–	+	–	**mita putie**
poss. *esculentum, lar*				
or *javanicum*				
Penaeidae				
Penaeus monodon,				
Metapenaeus sp.	+	–	–	**mita hahu**
	+	–	–	**mita nuae**
NEPHROPSIDEA[2] – lobsters				
Scyllaridae – flat lobster				
Thenus orientalis	+	–	–	**pepeuro**
Nephropidae – spiny lobster				
Panulirus versicolor				

Species	Ecological zones 1	2	3	Nuaulu gloss
PAGURIDEA[3] – hermit crabs	+	–	–	**kumake**
	+	–	–	**kuma kinihane, kuma moti, kuma hihikuro** etc.
BRACHYURA[4] – true crabs – rajungan				**katanopune**
Portunidae – swimming crabs				
Portunus pelagicus *Portunus sanguinolentus*	+	–	–	**suto**
Ocypodidae				
Ocypode cordimana	+	–	–	**katanopu nuae**
Ocypode cordimana	+	–	–	**katanopu kakante**
Grapsidae – rock crabs				
Sesarma sp.	–	–	+	**katanopu ai ukune**
Sesarmops impressum	–	+	–	**katanopu nahine**
Ptychognathus riedelii	–	+	–	**katanopu huse**
Metasesarma aubryi				
	–	+	+	**katanopu tanane** **katanopu kukurisa**
	–	–	+	**katanopu uri** **katanopu sirisa**
Potamidae – freshwater crabs				
	–	+	–	**katanopu tonate unte**
	–	+	–	**katanopu putie**
	–	–	+	**katanopu makapotae iane**
Gecarcinidae – land crabs				
Poss. *Cardiosoma* sp.				**katanopu manapesi**
Birgus latro – the coconut crab	–	–	+	**katanopu sipu-sipu**
ISOPODA – wood lice				
Thrombium sp.	–	–	+	**utu wesie, imarua**

Key. Zone 1 = marine; zone 2 = freshwater; zone 3 = terrestrial. *Notes*. 1. Suborder. 2. Superfamily. 3–4. Section.

Appendix 12 Checklist of Arachnid specimens recorded in the Nuaulu region of south central Seram, 1970–75

Species	Ecological zones 1	2	3	Nuaulu gloss
SCORPIONIDA – scorpions				
Isometrus maculatus	+	+	+	**kanopone**
UROPYGIDA				
UROPYGI – whip scorpions				
Uropygi sp.				
AMBYPYGI – tailless whip scorpions				
Charontidae	–	–	+	**kahuneke hatu nohu inae**
ACARIDA – mites and ticks				
Aponomma gervaisi				
Seiulus amboinensis				**utu**
PHALANGIDA – harvestmen				
Altobunus formosus	+	+	+	**riko-riko, nau asue**
ARANEIDA – spiders (hunters)				
Sparassidae				
Nephilia sp.	–	+	+	**kahuneke wala-wala, kahuneke wala-wala sonu, kahuneke metene, kahuneke onate, kahuneke ai ukune**

Species	Ecological zones 1	2	3	Nuaulu gloss
Nephilia maculata				
Heteropoda venatoria	+	−	−	**kahuneke numa, kahuneke titie**
(web-spinners)				
Theridiidae – irregular webs				
Theridion sp.	+	+	+	**kahuneke ai ukune**
Latrodectus hasselti – 'black widow'	+	+	−	**kahuneke titie**
Argiopidae – orb webs				
Argiope sp.	+	+	+	
Argiope aemula	+	+	+	**kahuneke titie**
				kahuneke nikate, kahuneke masikune

Key. Zone 1 = village; zone 2 = cultivated areas; zone 3 = forest.

Appendix 13 Checklist of annelids, echinoderms, myriapods and related forms featuring in Nuaulu terminology and knowledge, 1970–75

Species	Ecological zones 1	2	3	4	Nuaulu gloss
COELENTERATA					
– jellyfish	–	–	+	–	**nuae huae**
PLATYHELMINTHES – flatworms					
Taenia – tapeworm	–	–	–	+	**nikonake**
NEMATODA – roundworms					
human intestinal parasites	–	–	–	+	**susue, sohane**
incl. *Eunice viridis*	–	–	+	–	**mnatone**
ANNELIDA					
POLYCHAETA	–	–	+	–	**mnatone**
OLIGOCHAETA – earthworms					**tuaman (i)nae**
Pheretima (Pheretima) ceramensis	+	–	–	–	
Pontoscolex corethrurus	+	–	–	–	
PERICHAETA	+	–	–	–	**ai ntone**
HIRUDINEA – leeches	+	–	–	–	**sanna**
CHILOPODA – centipedes					**niniane**
Scolopendra morsitans	+	–	–	–	**nini oni**
Scolopendra subspinipes	+	–	–	–	**nini Bunara**
	+	–	–	–	**nini anane**

Species	Ecological zones 1	2	3	4	Nuaulu gloss
DIPLOPODA – millipedes					**nikenuke**
Thyropygus – giant millipede	+	–	–	–	
Rhinocricus – giant millipede	+	–	–	–	**nike putie, nike metene** **nike msinae**
– other millipedes					
MEROSTOMATA – horseshoe crabs					
Limulus moluccensis	–	–	+	–	**mimi**
ECHINODERMATA					
ASTEROIDEA, OPHIUROIDEA – starfish different colour phases of e.g.	–	–	+	–	**une nuae**
Protoreaster nodosus					**une msinae, une masikune**
Pentaceraster					**une marae, une putie, une metene**
prob. incl. *Linckia laevigata*					**une marae**
ECHINOIDEA – sea urchin	–	–	+	–	**tinene**
prob. *Echinotrix diadema*	–	–	+	–	**tine metene**
prob. *Tripneusteus gratilla*	–	–	+	–	**tine metene**
prob. *Diadema setosum*	–	–	+	–	**tine msinae**
prob. *Diadema saxatile*	–	–	+	–	**tine msinae**
HOLOTHUROIDEA – sea cucumbers, trepang	–	–	+	–	**taripan**

Key. Zone 1 = terrestrial; zone 2 = freshwater; zone 3 = marine (including intertidal regions); zone 4 = endoparasitic.

Notes

1 Introduction

1 For convenience, the ethnographic present should be understood as 1970–75. Where data collected on subsequent occasions might reasonably be expected to reflect recent changes I have tried to make this clear in the text.

2 Since the publication of *Classifications in their social context* [1979a], the issue of convergence of symbolic and cognitive anthropology has been much discussed, and is usefully summarised by Colby *et al.*, 1981.

3 It is appropriate to note that while the manuscript of the present book was with the publisher I received a copy of Brent Berlin's recent *Ethnobiological classification: principles of categorization of plants and animals in traditional societies* (1992, Princeton University Press), courtesy of the author. This important work, which revises in some important respects Professor Berlin's earlier views, also takes issue with some of my own criticisms of his writings, and those of others in a similar vein (some of which are reproduced here). Understandably, it has not been possible to take these into account at this late stage, though I look forward to the opportunity of doing so in the near future.

4 Algemeem Rijksarchief, The Hague: VOC 1293 (f. 176r, 1.4r), 1317 (f. 200r–v, 203r–v, f. 71), 1.44 (f. 56), 1368 (f. 40v) and 11245 [Rumphius, n.d.: 130–1].

5 The most regular orthographic usage adopted by the Indonesian administration. In previous publications I have written 'Ruhuwa', in order to harmonise with the rendering found in some earlier Dutch maps (e.g. Topographische Inrichting 1919, *Schetskaart van Ceram* (Scale 1:100,000), Batavia).

6 See Ellen, 1985; also, for certain nomenclatural revisions, Ellen, 1973: 140–8; Ellen, 1975b; and Ellen, 1978b: 65–8. Further information relating to other matters discussed in this section may be found in Ellen, 1973: 20–63, 368–73, 391–2, 446–64; and in Ellen, 1978b: 212–19.

7 The term *phylogenetic* is used throughout this work to cover all forms of 'scientific' taxonomic, systematical and nomenclatural practices. The term is imperfect, but I find the possible alternatives – 'Linnaean', 'Western', 'scientific', and so on – which I am occasionally tempted to resort to – equally if not more problematic.

8 One of these games is what the Nuaulu call **anokoco**, probably from AM **kocok**,

'to shuffle'. Alternatively, it is known to them as AM **main korki** (lit. 'game, to lose with the most cards'), a kind of rummy. Five or six cards are dealt out to each person, depending on the number of players; between four and six is the usual number. The rest of the pack is placed face downwards on the floor in between the players. The person on the right of the dealer plays first, though in subsequent games this is the victor of the previous game. The object is to get rid of the entire hand, playing to suit, and the person with the highest value card winning the round. If the player does not have the card of a particular suit he must take a card from the top of the stack until one of the appropriate suit comes up (**anotahon**, 'you suffer, endure', from AM **tahon**). When the stock has disappeared, a person unable to follow takes the highest-value card from those played, and the winner of the round so far plays again.

2 The language of classification

1 For some similar data see Taylor, 1983. However, in the Tobelo area of Halmahera little of the local language is spoken in some areas, especially by children, while Tobelo literacy is more advanced.

2 General linguistic classifiers can also be used in a Nuaulu noun phrase, but only two animal categories are reported to occur in this way: **hata** for bird and **usene** for fish (also used for eyes, round things). There is no general animal classifier corresponding to AM 'ekor' [Bolton, 1990: 74–5].

3 This, of course, assumes the morphosyntactic and semantic present, a concept homologous to 'the ethnographic present'. Thus, in British English we assume that 'release' is no longer analysable into 're + lease', and therefore must be treated as an unsegmented word [c.f. Taylor, 1990: 33]. On this and other objections to Berlin's set of definitions (their arbitrary separation of ethnobiological from other domains, the premise that we are dealing with special linguistic rules, inbuilt taxonomic assumptions, and the failure to distinguish words, compound words, phrases and their boundaries) see Taylor [1990: 40–1]. In following certain usages of Conklin, Berlin and Bulmer, I use this set of distinctions for convenience in describing Nuaulu terminologies, not as part of any formal linguistic description.

3 Processes of identification and the structure of categories

1 In large-scale, industrial and literate societies there is some evidence to suggest that the basic naming level is, at least for some purposes, much more inclusive, including 'life-form' categories [Brown, 1974; Dougherty, 1978].

2 It is virtually impossible to consider forms such as 'coral' or 'moss' as basic or non-basic. They can be treated as basic here only because the objects so denoted cannot with any certainty be described in any other way [Taylor, 1980: 271].

3 Often specimens were initially identified by informants at the generic level only. Only when a different species of the same genus was presented was it possible to discover the existence of less inclusive categories. There is also nomenclatural evidence in that it is only the *basic* term which can never be omitted in a label. Thus the frog terms **notu teteye** and **teteye** are alternates, while **wekae** is often heard instead of **nakatua wekae** for certain parrots and lories [c.f. Taylor, 1990: 55–8].

4 One independent means of discovering what might be the conception of distinctive features for particular animals is (a) to look at their representations in art and (b) to ask informants to draw animals. Unfortunately, Nuaulu unprompted figurative representations are limited to shield designs, charcoal scribbles on doorposts and bas-reliefs on drums.

4 The relations between non-basic categories

1 'Soul' is perhaps a rather unsatisfactory translation of this term. More strictly speaking, **inaha** is vital principle, as opposed to the spirit released on death (**nemati**) or a ghost (**matiunu**). Soul substance is an intrinsic constituent of blood, and consequently flows freely through other body-parts. No wonder then that organs such as the heart (**anoe**) sometimes exhibit soul-like features, as in **anoe rei kasaea**: translated to me as 'the soul is thirsty'.

2 The following version of the **ahinae nimoe** was recorded in February 1971. A man from Sopanan putie – 'white' Nuaulu who no longer exist, and who lived at the headwaters of the Ruatan – one day heard a sobbing and wailing from the sky. He asked why this should be so and was told that a young girl had died in the sky-world, and that her people were mourning for her. The man climbed a large buttress root of a tree (which in those days were very tall) until he reached the door of the sky-world, where an old woman was waiting to let him in. He brought the body of the girl back to earth again, but the father of the girl's mother called out to him that he had forgotten the small animals which eat the corpse, and he had to retrace his steps. This time, he brought with him from the sky-world flies, grubs and other creatures. If he had not done so the earth would soon have become crowded with dead bodies.

3 Cognate with AM **manusia**, its use is ubiquitous, particularly in religious discourse (humans as opposed to spirits, the cosmos, God and so on) and in proverbs, such as **ipane osa nene, mansia panesi** ('one clan, many people') [c.f. Taylor, 1990: 51].

4 This is a revision of a much earlier view [Ellen, 1972: 9] that 'the category **peni** appears ... *not* to represent a genuine taxonomic category in Nuaulu classification, rather a category based on a more singular attribute'.

5 Consistency, sharing and flexibility

1 Most variation is necessarily expressed lexically, but different words do not always indicate categorical differences. I am not concerned here with alternative labelling which can be explained through synonymy, dialect or other linguistic usages [Gardner, 1976: 447–52; Hage and Hawkes, 1975: 299, and works cited].

2 In general, if insignificant animals are at all in significant relationships with other animals which are significant in themselves, then they will tend to be ordered in classificatory systems [Bulmer *et al.*, 1975: 12–21].

6 Social intrusions and cultural styles

1 Dwyer attaches some significance to an overall 'small to large' pattern in Rofaifo animal transformations. While this may appear to add substance to the claim that such relationships are often conceived in terms of developmental

stages, there are no comparable regularities in the Nuaulu data (see table 6.2). But the arrangement might also be pushed in quite the opposite direction, since while (ontogenetically) small grows into large, obstetrically, large gives rise to small. Biological metaphors of this kind (if this is what they are) are bound to merge and marry, and on occasions may appear maddeningly inconsistent, but they do so by following through the inherent logic of the physiological process by which adult forms are biologically reproduced.

2 The same – village (permissible):forest (prohibited) – rule applies to a wide range of other expressions, among which are included expletives derived from the names of spirits (e.g. **painakite raia**). This is significant given the classificatory similarities between animals and spirits discussed below.

3 The following invocation is used to exorcise the **sakahatene**: **upuku Anahatana, namte tuamanae; auna apate rei remahatai sani waene nai iake nau harap**, meaning 'Lord Anahatana, root of the earth; heal this wound with smooth water which possesses goodness and divines hope'. It is worth remarking that the formulae in such spells are exactly the same for animal and spirit malevolence.

4 Consider, for example, the two terms of widest application used to describe spirits (**saruana** and **sionata**), which sometimes appear to be used interchangeably as the more inclusive term. On a number of occasions people spoke as though **saruana** labelled the category of widest application, distinguishing it from **saruana** in the specific sense and **sionata** (optionally **saruana sionate**), the undifferentiated dead. The reciprocal use of terms for transitively-related categories is a widespread feature of Nuaulu animal classification, as we have seen (chapter 3.5).

5 An **asumate** placed in the ground after an animal has been cooked is known as an **asumate isa tenue**. When it is cut, the chip from the pointed end is kept and afterwards tied to the pole again. This piece is known as a **kakomate** (**kakoma hahu, kakoma marane** and so on), is traditionally employed to skin the killed animal, and represents its spirit. The purposes of the **asumate** appear to be: to inform the ancestors that meat has been killed and that they should come and partake of it (**atanimai**); to confer prestige, the **asumate** being placed where everyone can see it; to return the spirit to the cosmos, and therefore ensure further good hunting.

7 Changes in classifying behaviour

1 An apparently contradictory example of this pattern is found with the common commensal mouse, *Mus musculus*. This is known to the Nuaulu as **mnaha** and may be optionally modified to **mnaha niane** and **mnaha numa** ('village' and 'house' mouse respectively). Thus, the domestic form is optionally marked without there apparently being any wild form. The solution to this puzzle appears to lie in the fact that the labels **mnaha** and **imanona** represent two contrasting types within a wider covert category of murids which allows for the labels to be used – to some extent – interchangeably. Thus, the marked **numa** is in implicit contrast to wild murids labelled **imanona** or **imanona ai ukune**. Indeed, some **imanona** were occasionally described to me as **mnaha wesie** (forest **mnaha**).

2 Blust has shown that words for marsupials with similar Proto-AN roots distributed on both sides of Wallace's line suggest something of the origin and antiquity of these languages; thus '*kandoRA' and '*mansar' (terms for cuscus and possibly other marsupials) 'were innovated in a speech community ancestral to many of the languages of eastern Indonesia and of Oceania, but not to the languages of Sulawesi' [Blust, 1982: 245].
3 There are other examples of naming animals after ritually important cloths. On Bandaneira [Rouffaer and Juynboll, 1914: 422] a type of shark termed **eo serasa bintang-bintang** is named after **serasah**, a reserve coloured painted cloth from Masulipatom, called 'chits' or 'sits' by the Dutch and 'chintz' by the English.

8 Cognition and the cultural relations of prehension

1 Moreover, Geertz's distinction is a product of a literate tradition in which representational models and plans for action are more obviously separate.
2 I am grateful to Kevin Durkin for pointing out to me that the dominance of past over future is controversial among developmental psychologists and philosophers of time. Thus, we must contrast a 'moving time' view, in which ego is static and time passing by, with a 'moving ego' view. There is also some disagreement in the literature as to which of, say, 'before' and 'after' should be said to be the marked term. Nevertheless, in mundane classificatory events, as in much individual interaction and subsistence decision-making, practical experience (of the past) on (future) action is crucial.

References

Amir, H. and J. Wind 1978. The nature reserves of Way Mual and Way Nua, central Seram, Maluku. *Field Report* 8, FO/JNS/73/013.

Ardener, E. 1975. The voice of prophecy: further problems in the analysis of events. *The Munro Lecture*, Edinburgh: Unpublished version.

1989. Comprehending others. In *The voice of prophecy, and other essays* (edited by Malcolm Chapman). Oxford: Basil Blackwell.

Atran, S. 1981. Natural classification. *Social science information* 20, 37–91.

1990. *Cognitive foundations of natural history*. Cambridge: Cambridge University Press.

Barnes, R. 1989. *The ikat textiles of Lamalera: a study of an eastern Indonesian weaving tradition* (Studies in South Asian Culture 14). Leiden: E. J. Brill.

Barrau, J. 1979. Coping with exotic plants in folk taxonomies. In *Classifications in their social context*. Ellen, R. F. and D. Reason (eds.). London: Academic Press.

Barth, F. 1975. *Ritual and knowledge among the Baktaman of New Guinea*. Oslo: Universitetsforlaget.

Bartlett, H. H. 1940. The concept of genus. I. History of the generic concept in botany. *Bulletin of the Torrey Botanical Club* 67(5), 349–62.

Bateson, G. 1973. *Steps to an ecology of mind: collected essays in anthropology, psychiatry, evolution and epistemology*. St Albans: Paladin.

Bausani, A. 1960. The first Italian–Malay vocabulary by Antonio Pigafetta. *East and West Series* 11, 229–48.

Beg, M. A. J. 1979. *Arabic loan words in Malay: a comparative study*. Kuala Lumpur: The Author.

Berlin, B., D. Breedlove and P. H. Raven 1966. Folk taxonomies and biological classification. *Science* 154, 273–5.

and P. Kay 1969. *Basic color terms*. Berkeley: University of California Press.

1972. Speculations on the growth of ethnobotanical nomenclature. *Language in Society* 1(1), 51–86.

D. Breedlove and P. H. Raven 1973. General principles of classification and nomenclature in folk biology. *American Anthropologist* 75, 214–42.

D. Breedlove and P. Raven 1974. *Principles of Tzeltal plant classification: an introduction to the botanical ethnography of a Mayan-speaking people of the highland Chiapas.* New York: Academic Press.

1976. The concept of rank in ethnobiological classification: some evidence from Aguarana folk botany. *American Ethnologist* 3, 381–99.

Bloch, M. 1971. The moral and tactical meaning of kinship terms. *Man (N.S.)* 6(1), 79–87.

1977. The past and the present in the present. *Man (N.S.)* 12, 278–92.

1985. From cognition to ideology. In *Power and knowledge: anthropological and sociological approaches.* Fardon, R. (ed.). Edinburgh: Scottish Academic Press.

Blust, R. A. 1974. Eastern Austronesian: a note. *Working Papers in Linguistics (Hawaii)* 6(4), 101–7.

1979. Proto-Western Malayo–Polynesian vocatives. *Bijdragen tot de Taal-, Land- en Volkenkunde* 135, 205–51.

1982. The linguistic value of the Wallace line. *Bijdragen tot de Taal-, Land- en Volkenkunde* 138(2–3), 231–50.

1984–5. The Austronesian homeland: a linguistic perspective. *Asian Perspectives* 26(1), 45–68.

Bolton, R. A. 1990. A preliminary description of Nuaulu phonology and grammar. University of Texas at Arlington: Unpublished MA dissertation.

Bouez, M. C. 1977. *Les parents cachés, les ancêtres et les autres, texte preparé pour le seminaire B2-523, Problèmes Ethnolinguistiques.* Université de Paris X: Laboratoire d'ethnologie et de sociologie comparative.

Bourdieu, P. 1977. *Outline of a theory of practice* (Cambridge Studies in Social Anthropology 16) (trans. Richard Nice). Cambridge: Cambridge University Press.

Bricker, V. R. 1974. Some cognitive implications of informant variability in Zinacanteco speech classification. *Language in Society* 3, 69–82.

Bright, J. O. and W. Bright 1965. Semantic structures in Northwestern California and the Sapir–Whorf hypothesis. *American Anthropologist* 67, 249–58.

Brown, C. H. 1974. Unique beginners and covert categories in folk biological taxonomies. *American Anthropologist* 76, 325–7.

J. Kolar, B. J. Torrey, T. Truong-Quang and P. Volkman 1976. Some general principles of biological and non-biological folk classification. *American Ethnologist* 3, 73–85.

1977. Folk botanical life-forms: their universality and growth. *American Anthropologist* 79, 317–42.

1979. Folk zoological life forms: their universality and growth. *American Anthropologist* 81, 791–817.

and S. R. Witkowski 1980. Language universals. In *Toward explaining culture: a critical review of findings of worldwide cross-cultural research.* Levinson, D. and M. J. Malone (eds.). New Haven: Human Relations Area Files.

1981. Growth and development of folk-zoological life-forms in the Polynesian language family. *Journal of the Polynesian Society* 90(1), 83–110.

and P. K. Chase 1981. Animal classification in Juchitan Zapotec. *Journal of Anthropological Research* 37, 61–70.

1984a. *Language and living things: uniformities in folk classification and naming.* New Brunswick, New Jersey: Rutgers University Press.

1984b. Life-forms from the perspective of *Language and living things*: some doubts about the doubts. *American Ethnologist* 11(3), 589–93.

1985. Mode of subsistence and folk biological taxonomy. *Current Anthropology* 26(1), 43–64.

Bruner, J. S., J. Goodnow and G. Austin 1956. *A study of thinking.* New York: Wiley.

R. L. Olver and P. M. Greenfield 1966. *Studies in cognitive growth.* New York: Wiley.

Bulmer, R. N. H. 1967. Why is the cassowary not a bird? A problem of zoological taxonomy among the Karam of the New Guinea highlands. *Man* 2, 5–25.

1968. Worms that croak and other mysteries of Karam natural history. *Mankind* 6, 621–39.

and M. Tyler 1968. Karam classification of frogs. *Journal of the Polynesian Society* 77, 333–85.

1969. *Field methods in ethno-zoology with special reference to the New Guinea highlands* (Mimeographed). Port Moresby: University of Papua and New Guinea.

1970. Which came first, the chicken or the egg-head? In *Échanges et communications; mélanges offerts à Claude Lévi-Strauss.* Pouillon, J. and P. Maranda (eds.). The Hague, Paris: Mouton.

and J. I. Menzies 1972–3. Karam classification of marsupials and rodents. *Journal of the Polynesian Society* 81–82(1,4), 472–99, 86–107.

1974. Memoirs of a small game hunter: on the track of unknown animal categories in New Guinea. *Journal d'Agriculture tropicale et de Botanique appliqée* 21, 79–99.

1974a. Folk biology in the New Guinea Highlands. *Social Science Information* 13(4–5), 9–38.

J. I. Menzies and F. Parker 1975. Kalam classification of reptiles and fishes. *Journal of the Polynesian Society* 3, 267–308.

1978. Totems and taxonomy. In *Australian aboriginal concepts.* Hiatt, L. R. (ed.). Canberra: Australian Institute of Aboriginal Studies.

1979. Mundane and mystical in Kalam classification of birds. In *Classifications in their social context.* Ellen, R. and D. Reason (eds.). London: Academic Press.

1985. Trees, grerbs, wugs, shwms and quammals: the new universal natural history of Cecil H. Brown. *Journal of the Polynesian Society* 94(4), 431–7.

Burling, R. 1964. Cognition and componential analysis: God's truth or hocus-pocus? *American Anthropologist* 66, 20–8.

Carroll, L. 1962. *Alice's adventures in wonderland and through the looking glass.* London: Penguin.

Casagrande, J. B. and K. L. Hale 1964. Semantic relationships in Papago folk-definitions. In *Studies in Southwestern ethnolinguistics.* Hymes, D. H. and W. E. Bittle (eds.). The Hague, Paris: Mouton.

Cense, A. A. 1978. Malaise invloeden in het oostelijk deel van de Indonesische Archipel. *Bijdragen tot de Taal-, Land- en Volkenkunde* 134(4), 415–32.

Chlenov, M. A. 1969. Ocherki po etnicheskoi istorii narodov tsentral'nykh Molukk (Indoneziia). Moscow: Summary of a dissertation at the N. N. Miklouho-Maklay Institute of Ethnography.

1976. *Naselenie Molukkskikh Ostrovov*. Moscow: Nauka.

1980. Cultural vocabulary as an indicator of interethnic relations: eastern Indonesian evidence. *Bijdragen tot de Taal-, Land- en Volkenkunde* 136, 426–39.

Clark, H. 1973. Space, time, semantics and the child. In *Cognitive development and the acquisition of language*. Moore, T. E. (ed.). New York: Academic Press.

Clark, R. 1981. Snakes, snails and 'life-forms'. *Journal of the Polynesian Society* 90, 267–9.

Cocq D'Armandville, C. J. F. 1901. Vergelijkende woordenlijst in het Hollandsch, Ceramschen Alfoersch (Bonfia). *Tijdschrift van de Bataviaasch Genootschap* 43, 349–96.

Colby, B., J. Fernandez and D. Kronenfeld 1981. Towards a convergence of cognitive and symbolic anthropology. *American Ethnologist* 8, 422–50.

Cole, M., J. Gay, J. A. Glick and D. W. Sharp 1971. *The cultural context of learning and thinking*. London: Methuen.

Colless, D. H. 1970. Type-specimens: their status and use. *Systematic Zoology* 19(2), 251–3.

Collins, J. T. 1980. The historical relationship of the languages of central Maluku, Indonesia. Unpublished doctoral dissertation: University of Chicago.

1983. Syntactic change in Ambonese Malay: the possessive construction. In *Studies in Malay dialects, Part II* (NUSA 17). Collins, J. (ed.). Jakarta: Badan Penyelenggara Seri NUSA.

1984. Linguistic research in Maluku: a report on recent fieldwork. *Oceanic Linguistics* 21(1–2), 73–146.

Conklin, H. C. 1954. The relation of Hanunóo culture to the plant world. New Haven: Ph.D. dissertation, Yale University.

1957. *Hanunóo agriculture, a report on an integral system of shifting cultivation in the Philippines* (Forestry Development Paper No. 12). Rome: Food and Agricultural Organization of the United Nations.

1962. Lexicographical treatment of folk taxonomies. In *Problems in lexicography* (International Journal of American Linguistics 28, 119–441: Publ. 21). Householder, F. W. and S. Saporta (eds.). Bloomington: Indiana University Research Center in Anthropology, Folklore and Linguistics.

1964. Ethnogenealogical method. In *Explorations in cultural anthropology*. Goodenough, W. H. (ed.). New York: McGraw-Hill.

1969. Lexicographical treatment of folk taxonomies. In *Cognitive anthropology*. Tyler, S. A. (ed.). New York: Holt, Rinehart and Winston.

Cooper, D. E. 1975. Alternative logic in 'primitive thought'. *Man* 10(2), 238–56.

Coxon, A. 1977. Classification and hierarchy construction as methods of eliciting subjective information. Paper presented at the Social Science Research Council seminar on 'Classification systems and the anthropology of knowledge' at the University of Kent at Canterbury, June.

Crick, M. 1976. *Explorations in language and meaning: toward a semantic anthropology*. London: Malaby Press.

Danckaerts, S. 1859 (1621). Historisch ende grondich verhael van de standt des Christendoms int quartier van Amboina (...). *Bijdragen tot de Taal-, Land- en Volkenkunde* 7, 105–36.

Darlington, P. J. 1957. *Zoogeography: the geographical distribution of animals.* New York: Wiley.

de Beaufort, L. F. 1959. Rumphius's fishes. In *Rumphius memorial volume.* de Wit, H. C. D. (ed.). Baarn: Hollandia N. V.

Dentan, R. K. 1968. Notes on Semai ethnoentomology. *Malayan Nature Journal* 21, 17–28.

1970. Labels and rituals in Semai classification. *Ethnology* 9, 16–25.

Diamond, J. M. 1966. Zoological classification system of a primitive people (Fore, New Guinea). *Science* 151(3714), 1102–4.

Dougherty, J. W. D. 1978. Salience and relativity in classification. *American Ethnologist* 5, 66–80.

Douglas, M. 1966. *Purity and danger.* London: Routledge and Kegan Paul.

1970. *Natural symbols: explorations in cosmology.* London: Barrie and Rockliffe.

Durkheim, E. and M. Mauss 1963. *Primitive classification* (trans. R. Needham). Chicago: Chicago University Press.

Dwyer, P. D. 1976a. Beetles, butterflies and bats: species transformation in New Guinea folk classification. *Oceania* 46, 188–205.

1976b. An analysis of Rofaifo mammal taxonomy. *American Ethnologist* 3, 425–45.

1979. Animal metaphors: an evolutionary model. *Mankind* 12, 13–27.

and D. C. Hyndman 1984. 'Frog' and 'lizard': additional life-forms from Papua New Guinea. *American Anthropologist* 85, 890–6.

Ekris, van, A. 1864–5. Woordenlijst van eenige dialecten der landtaal op de Ambonische eilanden. *Mededeelingen van wege het Nederlandsch Zendeling-genootschap* 9, 109–36.

Ellen, R. F. 1972. The marsupial in Nuaulu ritual behaviour. *Man* 7, 223–38.

1973. Nuaulu settlement and ecology: an approach to the environment relations of an eastern Indonesian community. Unpublished thesis submitted for the degree of Doctor of Philosophy in the University of London.

1975a. Variable constructs in Nuaulu zoological classification. *Social Science Information* 14, 201–28.

1975b. Non-domesticated resources in Nuaulu ecological relations. *Social Science Information* 14(5), 51–61.

A. F. Stimson and J. Menzies 1976a. The content of categories and experience. The case for some Nuaulu reptiles. *Journal d'Agriculture Tropicale et de Botanique Appliquée* 24, 3–22.

A. F. Stimson and J. Menzies 1976b. Structure and inconsistency in Nuaulu categories for amphibians. *Journal d'Agriculture Tropicale et de Botanique Appliquée* 23, 125–38.

1978a. Restricted faunas and ethnozoological inventories in Wallacea. In *Man and nature in Southeast Asia.* Stott, P. H. (ed.). London: School of Oriental and African Studies.

1978b. *Nuaulu settlement and ecology. The environmental relations of an eastern*

Indonesian community (*Verhandelingen van het Koninklijk Institut voor Taal-, Land- en Volkenkunde* 83). The Hague: Martinus Nijhoff.

1979a. Introductory essay. In *Classifications in their social context*. Ellen, R. F. and D. A. Reason (eds.). London: Academic Press.

1979b. Omniscience and ignorance: variation in Nuaulu knowledge, identification and classification of animals. *Language in Society* 8, 337–64.

1980. Cognitive models and total structures. A re-examination. In *The Nature of Structure* (ICA Publications 45), 95–145, Moyer, G. A., D. S. Moyer and P. E. de Josselin de Jong (eds.). Leiden: Leiden University, Institute of Cultural and Social Studies.

1982. *Environment, subsistence and system. The ecology of small-scale social formations*. Cambridge: Cambridge University Press.

1984. Trade, environment and the reproduction of local systems in the Moluccas. In *The Ecosystem Concept in Anthropology* (AAAS Selected Symposium 92), 163–204, Moran, E. F. (ed.). Boulder, CO: American Association for the Advancement of Science.

1985. Patterns of indigenous timber extraction from Moluccan rain forest fringes. *Journal of Biogeography* 12, 559–87.

1986. Microcosm, macrocosm and the Nuaulu house: concerning the reductionist fallacy as applied to metaphorical levels. *Bijdragen tot de Taal-, Land- en Volkenkunde* 142(1), 1–30.

1987. Review of 'Language and living things' by Cecil H. Brown. *Language in Society* 16, 123–30.

1988a. Foraging, starch extraction and the sedentary lifestyle in the lowland rainforest of central Seram. In *History, evolution and social change in hunting and gathering societies*. Woodburn, J., T. Ingold and D. Riches (eds.). London: Berg.

1988b. Fetishism. *Man* 23(1), 1–23.

1993. *Nuaulu ethnozoology: a systematic inventory* (Monogr. 6). University of Kent at Canterbury: Centre for Social Anthropology and Computing.

Ericsson, R. A., W. G. Chase and S. Faloon 1980. Acquisition of a memory skill. *Science* 208, 1181–2.

Fabian, J. 1975. Taxonomy and ideology: on the boundaries of concept-classification. In *Linguistics and anthropology: in honor of C. F. Voegelin*. Kinkade, M. D., K. L. Hale and O. Werner (eds.). Lisse: The Peter de Ridder Press.

Foucault, M. 1970. *The order of things: an archaeology of the human sciences*. London: Tavistock.

Fowler, C. S. and J. Leland 1967. Some northern Paiute native categories. *Ethnology* 6(4), 381–404.

Fox, J. J. 1971. Sister's child as plant: metaphors in an idiom of consanguinity. In *Rethinking kinship and marriage* (ASA Monograph in social anthropology 11), 219–53, Needham, R. (ed.). London: Tavistock Publications.

1975. On binary categories and primary symbols: some Rotinese perspectives. In *The interpretation of symbolism* (Association of Social Anthropologists, Studies 2). Willis, R. (ed.). London: Malaby.

(ed.) 1980. *The flow of life: essays on eastern Indonesia*. Cambridge, Massachusetts: Harvard University Press.

1988. Introduction. In *To speak in pairs: essays on the ritual languages of eastern Indonesia*. Fox, J. J. (ed.). Cambridge: Cambridge University Press.

Frake, C. O. 1961. The diagnosis of disease among the Subanun of Mindanao. *American Anthropologist* 63, 113–32.

1969 (1964). Notes on queries in ethnography. In *Cognitive anthropology*. Tyler, S. A. (ed.). New York: Holt, Rinehart and Winston.

Friedberg, C. 1968. Les méthodes d'enquête en ethnobotanique. *Journal d'Agriculture Tropicale et de Botanique Appliquée* 15, 297–324.

1970. Analyse de quelques groupements de végétaux comme introduction à l'étude de la classification botanique Bunaq. In *Échanges et communications: mélanges offerts à Claude Lévi-Strauss*. Pouillon, J. and P. Maranda (eds.). The Hague, Paris: Mouton.

1971. Aperçu sur la classification botanique Bunaq (Timor central). *Bulletin Botanique Français* 118, 255–62.

1974. Les processus classificatoires appliqués aux objets naturels et leur mise en évidence: quelques principes méthodoliques. *Journal d'agriculture Tropicale et de Botanique Appliquée* 21, 313–34.

1979a. Socially significant plant species and their taxonomic position among the Bunaq of central Timor. In *Classifications in their social context*. Ellen, R. F. and D. Reason (eds.). London: Academic Press.

1979b. Classifications rituelles, classifications profanes: les exemples Australiens. *Journal d'agriculture Tropicale et de Botanique Appliquée* 26(2), 147–59.

Gal, S. 1973. Inter-informant variability in an ethno-zoological taxonomy. *Anthropological Linguistics* 15, 203–19.

Gardner, P. 1976. Birds, words and a requiem for the omniscient informant. *American Ethnologist* 8, 446–68.

Gatewood, J. B. 1983. Loose talk: linguistic competence and recognition ability. *American Anthropologist* 85, 378–87.

Gay, J. 1981. Taxonomic and multi-dimensional representations of reality. In *Universals of human thought: some African examples*. Lloyd, B. and J. Gay (eds.). Cambridge: Cambridge University Press.

Geertz, C. 1966. Religion as a cultural system. In *Anthropological approaches to the study of religion* (Association of Social Anthropologists Monograph 3). Banton, M. (ed.). London: Tavistock.

Geoghegan, W. H. 1976. Polytypy in folk biological taxonomies. *American Ethnologist* 8, 469–80.

Gonda, J. 1938. Pigafetta's vocabularium van het 'Mokukken-Maleisch', *Bijdragen tot de Taal-, Land- en Volkenkunde* 97, 101–24.

Goody, J. 1977. *The domestication of the savage mind*. Cambridge: Cambridge University Press.

Greenberg, J. H. 1966. *Language universals with special reference to feature hierarchies*. The Hague: Mouton.

Grijns, C. D., W. de Vries and L. Santa Maria 1983. *European loan words in Indonesian*. Leiden: Koninklijk Instituut voor Taal-, Land- en Volkenkunde, for Indonesian Etymological Project.

Hage, P. and K. Hawkes 1975. Binumarien color categories. *Ethnology* 14(3), 287–300.

and W. R. Miller 1976. Eagle = bird: a note on the structure and evolution of Shoshoni ethnoornithological nomenclature. *American Ethnologist* 3(3), 481–8.

Harris, M. 1970. Referential ambiguity in the calculus of Brazilian racial identity. *Southwestern Journal of Anthropology* 26(1), 1–14.

Harris, P. and P. Heelas 1979. Cognitive processes and collective representations. *European Journal of Sociology* 20, 211–41.

Harrison, B. 1970. Translation as taxonomies. *Journal of Philosophical Linguistics* 1(2), 9–30.

1977. On understanding a general name. In *Communication and understanding*. Vesey, G. (ed.). Harvester Press.

Hays, T. E. 1974. Mauna: Explorations in Ndumba ethnobotany. Seattle: Ph.D. dissertation, University of Washington.

1976. An empirical method for the identification of covert categories in ethnobiology. *American Ethnologist* 8, 489–507.

1983. Ndumba folk biology and general principles of ethnobiological classification and nomenclature. *American Anthropologist* 85, 592–611.

Healey, C. 1978–9. Taxonomic rigidity in folk biological classification: some examples from the Maring of New Guinea. *Ethnomedizin* 5(3–4), 361–84.

Heekeren, van, H. R. 1958. *The bronze-iron age of Indonesia* (*Verhandelingen van het Koninklijk Instituut voor Land-, Taal- en Volkenkunde* 22). 's-Gravenhage: Martinus Nijhoff.

Heider, E. R. 1972. Probabilities, sampling and ethnographic methods: the case of Dani colour names. *Man (N.S.)* 7(3), 448–66.

Heider, K. G. 1969. Sweet potato notes and queries, or, the problem of all those names for sweet potatoes in the New Guinea highlands. *Kroeber Anthropological Society Papers* 4, 78–86.

Henderson, J. and J. P. Harrington 1914. *Ethnozoology of the Tewa Indians* (Bulletins of the Bureau of American Ethnology 56). Washington D.C.: Government Printing Office.

Hobart, M. 1982. Meaning or moaning? An ethnographic note on a little understood tribe. In *Semantic Anthropology* (Association of Social Anthropologists Monograph 22). Parkin, D. (ed.). London: Academic Press.

Hollis, M. and S. Lukes (eds.) 1982. *Rationality and relativism*. Oxford: Blackwell.

Holthuis van Bentham, L. B. 1959. Notes on pre-linnean carcinology (including the study of Xiphosura) of the Malay archipelago. In *Rumphius memorial volume*. de Wit, H. C. D. (ed.). Baarn: Hollandia N. V.

Hunn, E. 1973. Tzeltal folk zoology: The classification of discontinuities in nature. Berkeley: Ph.D. dissertation, University of California.

1975a. *Cognitive processes in folk ornithology: the identification of gulls*. University of California, Berkeley: Language Behaviour Research Laboratory.

1975b. The Tenejapa Tzeltal version of the animal kingdom. *Anthropological Quarterly* 48, 14–30.

1975c. A measure of the degree of correspondence of folk to scientific biological classification. *American Ethnologist* 2(2), 309–27.

1976. Toward a perceptual model of folk biological classification. *American Ethnologist* 3(3), 508–24.

1977a. An outline of Sahaptin bird classification. Omak, Washington: A working paper for the XII International Conference on Salishan Languages, August, pp. 1–15.

1977b. *Tzeltal folk zoology: the classification of discontinuities in nature.* London: Academic Press.

1979. The abominations of Leviticus revisited: a commentary on anomaly in symbolic anthropology. In *Classifications in their social context.* Ellen, R. F. and D. Reason (eds.). London: Academic Press.

1982. The utilitarian factor in folk biological classification. *American Anthropologist* 84, 830–47.

and D. H. French 1984. Alternatives to taxonomic hierarchy: the Sahaptin case. *Journal of Ethnobiology* 3, 73–92.

Karim, W.-J. *Mah Betisék concepts of living things* (LSE Monogr. on Social Anthropology). London: Athalone.

Kay, P. 1971. On taxonomy and semantic contrast. *Language* 47, 886–7.

Kern, H. 1990. *Ramayana. Oudjavaansch heldendicht uitgegeven door H. Kern.* 's-Gravenhage: Martinus Nijhoff.

Knight, D. 1981. *Ordering the world: a history of classifying man.* London: Burnett Books/Andre Deutsch.

Kraneveld, F. C. 1959. Rumphius and veterinarian science in the eastern archipelago. In *Rumphius memorial volume.* Wit, H. C. D. (ed.). Baarn: Hollandia N. V.

Lakatos, I. and A. Musgrave, (eds.) 1970. *Criticism and the growth of knowledge.* London: Cambridge University Press.

Lakoff, G. 1972. Hedges: a study in meaning criteria and the logic of fuzzy concepts. Papers from the 8th Regional Meeting, Chicago Linguistic Society, Chicago.

Lancy, D. F. and A. J. Strathern 1981. Making twos: pairing as an alternative to the taxonomic mode of representation. *American Anthropologist* 83, 773–95.

Leach, E. R. 1961. Rethinking anthropology. In *Rethinking Anthropology* (London School of Economics Monographs on Social Anthropology 22). Leach, E. R. (ed.). London: Athlone.

1964. Anthropological aspects of language: animal categories and verbal abuse. In *New directions in the study of language.* Lenneberg, E. (ed.). Cambridge, Mass.: MIT Press.

Lévi-Strauss, C. 1966. *The savage mind.* London: Weidenfeld and Nicolson.

Loski, R. A. and G. M. Loski 1989. The languages indigenous to eastern Seram and adjacent islands. In *Workpapers in Indonesian languages and cultures.* Laidig, W. D. (ed.). Ambon, Indonesia: Pattimura University and the Summer Institute of Linguistics.

Ludeking, E. W. A. 1868. *Schets van de Residentie Amboina.* 's-Gravenhage: Nijhoff.

Lyons, J. 1968. *Introduction to theoretical linguistics.* Cambridge: Cambridge University Press.

Majnep, I. S. and R. Bulmer 1977. *Birds of my Kalam country.* Auckland: Auckland University Press, Oxford University Press.

Malkin, B. 1958. Cora ethnozoology, herpetological knowledge: a bio-ecological and cross-cultural approach. *Anthropological Quarterly* 31(3), 73–90.

Manning, P. K. and H. Fabrega Jr. 1976. Fieldwork and the 'new ethnography'. *Man (N.S.)* 11(1), 39–52.

Manuputty, B. 1972. *Kamus ketjil bahasa Malajo Ambon kedalam bahasa Indonesia.* Mimeographed.

Martin, M. A. 1975. L'ethnobotanique science per se? A propos d'un livre de B. Berlin, D. E. Breedlove, P. H. Raven: 'The principles of Tzeltal plant classification'. *Journal d'agriculture Tropicale et de Botanique Appliquée* 7–9, 237–76.

Medawar, P. B. 1957. *The uniqueness of the individual.* London: Methuen.

Miller, G. A. 1956. The magical number seven, plus or minus two: some limits on our capacity for processing information. *Psychological Review* 63, 81–97.

Morris, B. 1976. Whither the savage mind? Notes on the natural taxonomies of a hunting and gathering people. *Man* 11, 542–57.

1979. Symbolism and ideology: thoughts around Navaho taxonomy and symbolism. In *Classifications in their social context.* Ellen, R. F. and D. Reason (eds.). London: Academic Press.

Needham, R. 1963: Introduction to *Primitive classification*, E. Durkheim and M. Mauss. Chicago: Chicago University Press.

1975. Polythetic classification: convergence and consequences. *Man (N.S.)* 10(3), 349–639.

1979. *Symbolic classification.* Santa Monica, California: Goodyear.

Ohnuki-Tierney, E. 1981. Phases in human perception/conception/symbolization processes: cognitive anthropology and symbolic classification. *American Ethnologist* 8, 451–67.

Peeters, A. 1979. Nomenclature and classification in Rumphius's 'Herbarium Amboinense'. In *Classifications in their social context.* Ellen, R. F. and D. Reason (eds.). London: Academic Press.

Perchonock, N. and O. Werner 1969. Navaho systems of classification: some implications for ethnoscience. *Ethnology* 8(3), 229–43.

Randall, R. A. 1976. How tall is a taxonomic tree? Some evidence for dwarfism. *American Ethnologist* 3, 543–53.

and E. S. Hunn 1984. Do life-forms evolve or do uses for life? Some doubts about Brown's universals hypothesis. *American Ethnologist* 11, 329–49.

Rappaport, R. A. 1971. The sacred in human evolution. *Annual Review of Ecology and Systematics* 2, 23–44.

Raven, P. H., B. Berlin and D. E. Breedlove 1971. The origins of taxonomy. *Science* 174, 1210–13.

Reason, D. 1979a. Simple measures of variation in lexical fields. *Language in Society* 8, 360–4.

1979b. Classification, time and the organization of production. In *Classification in their social context.* Ellen, R. F. and D. Reason (eds.). London: Academic Press.

n.d. On the essential futility of formal representations of folk classifications. Unpublished manuscript.

Ribbe, C. 1889. Betrage zur Lepidopteren-Fauna von Gross-Ceram. *Iris, Deutsche Entomologische Zeitschrift* 2, 187–265.

1892. Ein Aufenthalt auf Grosz Seram. *Jahresberichte des Vereins für Erkunde* 22, 129–216.

Romney, A. K. and R. G. D'Andrade 1964. *Transcultural studies of cognition. American Anthropologist* 66(3), part 2: *American Anthropologist* Special Publication.

Rosaldo, M. Z. 1972. Metaphors and folk classification. *Southwestern Journal of Anthropology* 28(1) 83–99.

and J. M. Atkinson 1975. Man the hunter and woman: metaphors for the sexes in Ilongot magical spells. In *The interpretation of symbolism* (ASA Studies 2). Willis, R. (ed.). London: Malaby Press.

Rosch, E., C. B. Mervis, W. D. Gray, D. M. Johnson and P. Boyes-Braem 1976. Basic objects in natural categories. *Cognitive Psychology* 8, 382–439.

1977. Human categorisation. In *Studies in cross-cultural psychology*. Warren, N. (ed.). London: Academic Press.

1978. Principles of categorisation. In *Cognition and categorisation*. Rosch, E. and B. Lloyd (eds.). Hillsdale, N.J.: Lawrence Erlbaum Associates.

Rouffaer, G. P. and H. H. Juynboll 1914. *De batik-kunst in Nederlandsch-Indie en hare geschiedenis op grond van materiaal aanwezig in 's Rijks Etnographisch Museum en andere openbare en particuliere verzamelingen in Nederland.* Haarlem: Kleinmann.

Rumphius, G. E. 1741 [1705]. *D'Amboinsche Rariteitkamer*. Amsterdam: Third Impression.

1741–55. *Herbarium Amboinense – Het Amboinsche Kruid-boek*. Amsterdam: First impression.

n.d. *De generale Landbeschrijving van het Ambonsche Governement*. The Hague: Algemeen Rijksarchief.

Sacks, S. (ed.) 1979. *On metaphor*. Chicago: Chicago University Press.

Salmond, A. 1982. Theoretical landscapes. On a cross-cultural conception of knowledge. In *Semantic anthropology* (Association of Social Anthropologists, Monograph 22). Parkin, D. (ed.). London: Academic Press.

Salzman, P. 1981. Culture as enhabilmentis. In *The structure of folk models* (Association of Social Anthropologists, Monograph 20). Holy, L. and M. Stuchlik (eds.). London: Academic Press.

Sankoff, G. 1971. Quantitative analysis of sharing and variability in a cognitive model. *Ethnology* 10, 389–408.

Sapir, E. 1921. *Language: an introduction to the study of speech*. New York: Harcourt, Brace and World.

Simpson, G. G. 1961. *Principles of animal taxonomy*. New York: Columbia University Press.

Sperber, D. 1975. Pourquoi les animaux parfaits, les hybrides et les monstres sont-ils bon à penser symboliquement? *L'Homme* 15(2), 5–34.

1985. *On anthropological knowledge*. Cambridge: Cambridge University Press.

Spradley, J. P. 1979. *The ethnographic interview*. New York: Holt, Rinehart and Winston.

Stokhof, W. A. L. (ed.) 1981. *Holle lists: vocabularies in languages of Indonesia.*

Vol. 3/2. Central Moluccas: Seram (11) (Pacific Linguistics, Series D – No. 44). Canberra: Australian National University.

Stresemann, E. 1914. Die Vogel von Seran. *Novitiates Zoologie* 21, 25–153.

1927. Die Lauterscheinungen in den amboinischen Sprachen. *Zeitschrift für Eingeboren-Sprachen* 10.

Sturtevant, W. C. 1964. Studies in ethnoscience. *American Anthropologist* 66(3), 99–131.

Super, C. M., S. Harkness and L. M. Baldwin 1977. Category behaviours in natural ecologies and in cognitive texts. *Quarterly Newsletter of the Laboratory for Comparative Human Cognition* 1(4), 4–7.

Tambiah, S. J. 1969. Animals are good to think and good to prohibit. *Ethnology* 8, 424–59.

Taylor, P. M. 1980. Tobelorese ethnobiology: the folk classification of 'biotic forms'. A dissertation presented to the Faculty of the Graduate School of Yale University in candidacy for the Degree of Doctor of Philosophy.

1983. North Moluccan Malay: notes on a 'substandard' dialect of Indonesian. In *Studies in Malay dialects, Part II* (NUSA Monograph Series 17). Collins, J. (ed.). Jakarta: Badan Penyelenggara Seri NUSA.

1984a. 'Covert categories' reconsidered: identifying unlabelled classes in Tobelo biological classification. *Journal of Ethnobiology* 4(2), 105–22.

1984b. Tobelorese deixis. *Anthropological Linguistics* 26(1), 102–22.

1990. *The folk biology of the Tobelo people: a study in folk classification* (Smithsonian Contributions to Anthropology 34). Washington D.C.: Smithsonian Institution Press.

Tham Seong Chee 1979. The Malay language in Singapore. In *Papers on Southeast Asian languages*. Llamzon, T. A. (ed.). Singapore: Singapore University Press.

Turner, N. J. 1974. Taxonomic systems and ethnobotany of three contemporary Indian groups of the Pacific Northwest (Haida, Bella Coola, and Lilloet). *Syesis* 7, supplement 1.

Tweedie, M. 1970. *Animals of southern Asia*. London: Hamlyn.

Tyler, S. A. (ed.) 1969. *Cognitive anthropology*. New York: Holt, Rinehart and Winston.

1978. *The said and the unsaid*. London: Academic Press.

Valentijn, F. 1724–6. *Oud en Nieuw Oost-Indiën*. 8 vols. Dordrecht–Amsterdam.

Verheijen, J. A. J. 1963. Bird-names in Manggarai, Flores, Indonesia. *Anthropos* 58, 677–718.

Waddy, J. 1982. Biological classification from a Groote Eylandt Aborigine's point of view. *Journal of Ethnobiology* 2, 63–77.

Wallace, A. F. C. 1970. *Culture and personality*. (2nd edn) New York: Random House.

Wallace, A. R. 1962 (1869). *The Malay Archipelago*. New York: Dover.

Werner, O. and J. Fenton 1973. Method and theory in ethnoscience or ethnoepistemology. In *A handbook of method in cultural anthropology*. Naroll, R. and R. Cohen (eds.). New York and London: Columbia University Press.

White, C. M. N. 1973. Night herons in Wallacea. *Bulletin of the British Ornithological Club* 93, 175–6.

and M. D. Bruce 1986. *The birds of Wallacea (Sulawesi, the Moluccas and Lesser Sunda Islands, Indonesia)*. London: B. O. U. Checklist no. 7.

Whiteley, W. H. 1966. Social anthropology, meaning and linguistics. *Man (N.S.)* 1(2), 139–57.

Wierzbicka, A. 1984. Apples are not a 'kind of fruit': the semantics of human categorization. *American Ethnologist* 11(2), 313–28.

Willis, R. 1974. *Man and beast*. London: Hart-Davis.

Witkowski, S. R. and C. H. Brown 1977. An explanation of color nomenclature universals. *American Anthropologist* 79, 50–7.

and C. H. Brown 1978. Lexical universals. *Annual Review of Anthropology* 7, 427–51.

and C. H. Brown 1983. Marking-reversals and cultural importance. *Language* 59(3), 569–82.

Wouden, van, F. A. E. 1968. *Types of social structure in eastern Indonesia* (Koninklijk Instituut voor Taal-, Land- en Volkenkunde Translation Series 11, translated by Rodney Needham). The Hague: Martinus Nijhoff.

Author Index

d'Abreu, A., 204
Amir, H., 21
D'Andrade, R. G., 126, 127
Ardener, E., 61, 185, 234
Atkinson, J. M., 182
Atran, S., 119, 216

Barnes, R., 205
Barrau, J., 188
Barth, F., 181
Bartlett, H. H., 67, 119
Bateson, G., 73
Bausani, A., 206
de Beaufort, L. F., 166
Beg, M. A. J., 61
Berlin, B., 1–3, 17, 23, 33, 47, 49, 51, 58, 67, 68, 71, 73, 76, 78–9, 86, 87, 89–90, 96, 98–9, 102, 110, 116, 118–20, 126, 151, 158, 161, 162, 190, 210, 217–20, 227, 277–8
Bloch, M., 64, 128, 184, 215
Blust, R. A., 35, 36, 197, 199, 281
Bolton, R. A., 37, 96, 97, 199, 278
Bouez, M. C., 178
Bourdieu, P., 74, 94, 148, 231
Breedlove, D., 119, 120, 151, 162, 217–19
Bricker, V. R., 129, 145
Bright, J. O., 219
Bright, W., 219
Brown, C. H., 33, 44, 55, 72, 83, 85, 93, 98, 99, 108, 111, 115–19, 178, 179, 189, 190, 193–5, 210–13, 218, 226, 228, 278
Bruce, M. D., 21
Bruner, J. S., 32, 72, 226, 227
Bulmer, R. N. H., 1–3, 17, 19, 22, 41, 49, 56, 58, 67, 68, 71–3, 76, 81, 88, 90–1, 99, 111–12, 115, 119, 124, 128–9, 134, 136, 142, 145, 147, 150, 151, 153, 155, 157–8, 162–3, 167, 173, 178, 183, 210, 220–1, 223, 278–9
Burling, R., 219

de Candolle, A. P., 218
Carroll, L., 35
Casagrande, J. B., 59, 62, 63
Cense, A. A., 206
Chase, P. K., 33, 118, 190, 193, 210, 213
Chlenov, M. A., 35, 200, 205
Clark, H., 233
Clark, R., 99
Cocq D'Armandville, C. J. F., 191, 197
Colby, B., 277
Cole, M., 28
Colless, D. H., 65
Collins, J. T., 36, 37, 189, 197, 199, 203, 205–7
Conklin, H. C., 1–3, 27, 45, 49, 63, 67, 90, 119–20, 141, 158, 160–3, 220, 226, 228, 278
Cooper, D. E., 183
Coxon, A., 132
Crick, M., 165

Darlington, P. J., 8, 15
Dentan, R. K., 178, 182
Diamond, J. M., 78
Dougherty, J. W. D., 278
Douglas, M., 3, 73, 149, 184, 215
Durkheim, E., 68, 73, 75, 149, 165, 184, 185
Dwyer, P. D., 56, 68, 71, 90, 96, 99, 151, 163, 167, 185, 187, 213, 220–1, 279
Dyen, I., 36

Ekris, van, A., 35
Ellen, R. F., 1, 3, 6, 8–9, 14–15, 17, 20, 26, 38, 44, 68, 70–1, 81, 87–8, 97, 99, 111, 113, 115, 127, 129–32, 134–6, 138–9, 143, 145, 154, 158, 160–1, 165–6, 173, 174, 176, 180, 182, 184, 191, 194, 197, 204–5, 207, 215, 217, 219–21, 227–8, 277, 279

Ericsson, R. A., 227

Fabian, J., 226
Fabrega, H. Jr., 127, 129
Fenton, J., 26, 43, 59
Foucault, M., 215, 221
Fowler, C. S., 111
Fox, J. J., 3, 180, 185, 217
Frake, C. O., 126, 158, 219
French, D. H., 99, 118
Friedberg, C., 129, 138, 146, 182, 183, 217–21, 228

Gal, S., 126, 144
Gardner, P., 127, 132, 224, 279
Gatewood, J. B., 64
Gay, J., 219, 226, 227
Geertz, C., 149, 230, 281
Geoghegan, W. H., 158, 162
Gonda, J., 206
Goody, J., 31, 32
Greenberg, J. H., 85
Grijns, C. D., 206

Hage, P., 119, 129, 279
Hale, K. L., 59, 62, 63
Harrington, J. P., 126
Harris, M., 129
Harris, P., 150, 215, 222, 229
Harrison, B., 221
Haudricourt, A., 36
Hawkes, K., 129, 279
Hays, T. E., 25, 28, 58, 90–1, 98–9, 109, 119, 121–2, 127, 129–30, 132, 135–6, 141, 145, 147–8
Healey, C., 25, 217, 220–1, 226
Heekeren, van, H. R., 206
Heelas, P., 150, 215, 222, 229
Heider, E. R., 25, 28, 129
Heider, K. G., 145
Henderson, J., 126
Herskovits, M., 141
Hobart, M., 227
Hollis, M., 165
Holthuis van Bentham, L. B., 85
Hunn, E., 16, 33, 47, 50, 68, 72, 73, 83, 90, 98–9, 110, 117–19, 124, 127, 129, 135, 149, 151, 158, 160–3, 183, 184, 217–20, 222, 226–7
Hyndman, D. C., 99

Juynboll, H. H., 281

Karim, W-J., 97, 179
Kay, P., 73, 99, 218, 220, 223
Kern, H., 200
Knight, D., 126
Kraneveld, F. C., 207

Lakatos, I., 225
Lakoff, G., 219
Lancy, D. F., 28, 58, 63, 186, 218, 227–8
Leach, E. R., 73, 74, 149, 215, 229
Leland, J., 111
Lévi-Strauss, C., 98, 158, 173, 184, 215, 219, 225, 231
Loski, G. M., 37
Loski, R. A., 37
Ludeking, E. W. A., 197
Lukes, S., 165
Lyons, J., 63

Majnep, I. S., 221
Malkin, B., 141
Manning, P. K., 127, 129
Manuputty, B., 206
Martin, M. A., 221
Mauss, M., 68, 149, 165, 184–5
Medawar, P. B., 231
Menzies, J. I., 2, 17, 20, 26, 58, 163, 221
Miller, G. A., 107, 119
Morris, B., 98, 184
Musgrave, A., 225

Needham, R., 3, 129, 183, 185, 228
Nida, E., 141, 158, 160–3

Ohnuki-Tierney, E., 65, 216

Peeters, A., 16
Perchonock, N., 28, 63, 108, 111, 127, 220, 225, 230

Randall, R. A., 90, 99, 124, 219
Rappaport, R. A., 125
Raven, P. H., 109, 119, 120, 151, 158, 162, 217–19
Reason, D., 131, 230, 232–3
Ribbe, C., 16
Romney, A. K., 126
Rosaldo, M. Z., 51, 129, 134, 159, 182, 185
Rosch, E., 67, 68, 71–4, 227; see also Heider, E. R.
Rouffaer, G. P., 281
Rumphius, G. E., 15, 16, 85, 166, 167, 207, 277

Sacks, S., 165
Salmond, A., 41
Salzman, P., 228
Sapir, E., 187
Simpson, G. G., 72, 93, 129
Sperber, D., 183, 231
Spradley, J. P., 226
Stokhof, W. A. L., 37, 197
Strathern, A. J., 28, 58, 63, 186, 218, 227–8
Stresemann, E., 16, 35, 37, 193, 200

Sturtevant, W. C., 214
Super, C. M., 227

Tambiah, S. J., 149
Taylor, P. M., 29, 47, 50, 62–4, 67–8, 83, 90–1, 93, 96–8, 109, 111, 119, 120–1, 123, 126, 169, 175, 192, 217, 220, 227, 278–9
Tham Seong Chee, 63
Turner, N. J., 219
Tweedie, M., 24, 80, 193
Tyler, S. A., 17, 68, 72, 128–9, 136, 142, 153, 219, 228, 233

Valentijn, F., 207
Verheijen, J. A. J., 51, 127

Waddy, J., 71, 111
Wallace, A. F. C., 127, 214, 232
Wallace, A. R., 4, 8, 16, 37
Werner, O., 26, 28, 43, 59, 63, 108, 111, 127, 220, 225, 230
White, C. M. N., 8, 21
Whiteley, W. H., 138
Whorf, B. L., 73
Wierzbicka, A., 109, 222
Willis, R., 183
Wind, J., 21
Witkowski, S. R., 55, 83, 85, 93, 189, 194, 195, 211
Wittgenstein, L., 76
Wouden van, F. A. E., 3

Subject index

ad hoc categories and descriptions 43, 45–7, 49, 55, 70, 83
adjectival qualifiers 52, 54–7, 62, 122, 169, 181, 188, 194
age, as a factor affecting classifactory knowledge 135–7, 144
alliance 6, 8, 228
allusion 55, 62
alternation 228
AM, *see* Ambonese Malay
ambiguity 124–5, 128, 232–3
Ambonese
  ethnobiology 15
  Malay 15, 24, 27, 37–9, 46, 58, 97, 115, 137, 190, 192, 199–201, 205, 207–9, 279
Ambonese and Malay conceptions of knowledge 16
amphibians, *see* frogs
analogy 74, 111, 180, 182, 216, 218
anatomical terms 59, 183
animal
  classifiers 97
  domestication 6
  extinction 188
  Nuaulu definitions of 95–8
  partonyms 54, 56
  trophies 19
animals and supernatural entities 150, 152, 176–9
anomaly 113, 129, 159, 170, 179, 182–5, 220, 224, 228
antonymy 60
Arabic 61, 190, 207
Aristotle 216, 218, 226
attribution 59–60, 62
Austronesian 35–6, 50, 58, 180, 200–1, 211
  evolution of life-form nomenclature 210–12
authority in matters relating to knowledge 128, 134, 136, 147, 231
avoidance 166, 183

backwards scanning 33
basic and extended ranges 78
basic categories 67–71, 89–90, 92–3, 95, 102, 122
basic naming level 124, 278
bats 15, 19–20, 42, 56, 66, 72, 77, 82, 102, 105, 107–8, 114–15, 119, 153–4, 172, 194, 197, 207, 221, 227–8, 238–9
bilingualism 137, 190, 208
binary contrast 31, 63, 83–6, 88, 108, 111, 128, 179, 182, 228
binomials 45, 49, 52–3, 64, 88, 115, 121, 163, 169, 178, 188–9, 191, 194
biotopes 9–11, 14, 42
birds 14–5, 19–20, 42, 45, 49, 57, 62, 72, 74, 81, 83, 86, 102, 107–8, 110, 114–21, 132, 153, 155, 163, 173, 184, 193, 195, 206, 210–12, 227, 240–7, 278
borrowing 192, 213
butterflies 20, 24, 41, 52, 55, 57, 59, 61, 64, 83, 102, 105, 107–8, 116–17, 122, 167–8, 229

card
  games 27, 277–8
  sorting methods 24–5, 62, 103–4, 106–9, 116–17, 120, 133, 142, 225
cassowary 19–20, 26, 105, 108, 113–15, 132, 142, 158–60, 164, 166, 172, 174–5, 182, 184, 189, 200, 202–4
category
  boundaries 73–4, 76, 86–7, 155, 183, 219
  extension 75, 83, 86, 119, 178, 193
  regression 81
  structure 66–92, 278
caterpillars 57, 61, 102, 167–8, 203
cats 24, 59, 105, 114, 189, 202–4, 206
centipedes 45, 56, 105, 113, 165, 171, 211

chaining effect 121
changes in classifying behaviour 280
chickens 81, 195, 200, 202–3, 207
chunking 32
civets 103, 105, 115, 135, 189, 202–4
class inclusion 59–61, 63, 139, 146, 191, 228
classifications
  as composed of reified categories 187
  as parts of belief systems 150
  scientific 204
classificatory
  decay 190
  load 89
  space, dimensions of 133, 147
  'systems' 109, 123
classifying
  as a process 90, 148, 187, 220–3, 233
  in a pragmatic contexts 158–63
cockatoos 19, 21, 46, 62, 142, 172–3, 189, 197, 200, 205
cognitive
  process 75, 149–50, 215
    and collective representations 1, 215–16
    in relation to belief 215
  prototypes 31, 72–5, 89, 93, 102, 116–18, 124–5
  rationalisation 191
  re-organisation 214
co-hyponymy 120
colonialism 209–10
colour terms and categories 54–5, 99, 129
communication 231–2
comparison 60, 62
complementarity 228
componential analysis 219
computer databases 75
concretisation 68
consistency 126–48, 279
  defined 130
context 221, 224
  in classification 132
contextual variability 138–43, 217
contraction of terms 44
contrast 55, 63, 84, 86–7, 112, 181–2, 216–17, 219–20, 227
control hierarchy 125
core–periphery models 76, 117
correspondence between Nuaulu categories and phylogenetic species 15, 150–8
cosmology 84, 180
covert categories 29, 70, 95, 99, 103, 117, 119–21, 155, 220, 280
cows 105, 114, 189, 192, 202–4, 206–7
criteria clustering 72–5, 89, 211
criteria of allocation 109–16
crocodiles 26, 60, 105, 107–8, 117, 140, 143, 147, 153, 155, 164, 172–4, 197, 200
cross-cultural
  comparison 16
  psychology 28
cross-cutting classifications 33, 95, 122–4, 220–1
cross-language interference 33
crustacea 13, 31, 47, 56–7, 86, 102, 104–5, 107–8, 117, 136, 142, 165, 271–2
cultural
  contact 189
  dualism 84, 179–84
  relativism 73, 150
  significance 141, 153, 155, 158, 161, 189
  universals 150
culture and psychology 3
cuscus 45, 49, 55–6, 59, 64, 70, 105, 115, 117, 154, 156, 158–60, 164, 166, 172, 174, 178, 180, 182, 184, 191, 194, 197–8, 220, 281

dangerousness 161
decomposition 232
decoys 23
deduction 96, 125, 218, 222
deer 19, 50, 58, 86, 105, 108, 113–15, 132, 158, 160, 164, 175, 188–9, 193, 202–4, 206
definitional implication 121
degree of
  correspondence 71
  inclusiveness 88–92
deixis 61–2
descriptive qualifiers 51, 55
developmental stages and terminology 43, 48–9, 69, 102, 157, 279–80
dialect 44, 279
dichotomous division 74, 84–5, 90, 92, 179, 225, 228
dictionaries 118
dietary regulations 167
differentiation index 152, 157, 161
dimension salience 63, 210
disability, physical and mental 136–7
discourse 58–63
distinctive features 72–5, 94, 128
dogs 6, 25, 59, 69, 114, 164, 166, 189, 195, 200, 202–4, 206
dualism as a linguistic feature 26, 228
dualism, cultural 184
ducks 202–3, 207
Durkheimian theory of knowledge 73, 75, 149
Dutch 6, 190
  influence 189, 204, 206–7

economic change 135
elephant 24, 152, 204, 206–7

elicitation
  contexts of 129, 145
  techniques of 25, 124, 126, 132, 229
ellipsis, 191, 213
endemism 14, 15, 162–3, 196–7, 206, 209
epidemiology of ideas 231
ethnobiology
  of Seram, early accounts 16
  and social anthropology 1
ethnocentrism 92
ethnographic research procedures 22
ethnosemantics 217
etic grid 16
etymology 51
  folk 207
events and the shaping of concepts 232
evolutionary
  changes in classification 187
  theory 3, 68, 128
exemplification 60
expansion of categorical context 192, 194
expletives 175–6, 280
extension 213
extrinsic meaning 51

facilitation 232
feature contrasts 219
fieldwork conditions 145
figures of speech 203
fish (including marine mammals) 19–20, 42, 46, 57, 84, 102, 104–5, 107–8, 116–17, 136, 142–3, 153, 155, 166, 175–6, 182, 192, 206–12, 254–9, 278
fishing 136, 138, 143, 158
flexibility 2, 53, 71, 123–4, 126–48, 150, 217, 220–1, 228, 279
  defined 130
folk
  classification, as applied rather than theoretical knowledge 158, 163
  definitions 63
  representation 90
formal
  language 182
  methods of elicitation 23
  tests of classifying behaviour 27–31, 114
free variation 43–5, 191
frogs 14, 19–20, 26, 31, 42, 51, 53, 61, 69, 74, 81, 84, 86–7, 102, 107–8, 114, 116–17, 119–20, 127, 131, 134–5, 139–40, 142, 144, 147, 151, 153–5, 159, 164, 166–70, 178, 182, 194–5, 203, 253
function 60, 62
fuzzy categories 74, 87, 133, 183, 219, 225

geckos, 52, 61, 85, 113, 139–40, 142, 164, 194, 207
gender 84–5, 127, 136
  affixes 194
general purpose classifications 109–10, 115
generic plurals 49
generics 17, 68, 71, 87, 90–1, 99, 210, 218
genetic classification of Nuaulu language 36
genus concept 61, 68
gestalt 72, 86, 92, 117, 129
goats 50, 105, 114, 189, 202–3, 206
grading and gradation 59–60, 62, 86–7
grubs 57, 102, 203

hedges, linguistic 74, 120
hierarchicalisation of information 32
hierarchy 88, 90, 96, 124, 146, 186, 219–20, 224–5, 228
  Linnaean 125
historical
  contingency 149
  linguistics 226
homonymy 220
hornbills 19, 24, 41, 94, 105, 113–14, 164, 166, 182, 197–8, 200
horses 105, 114, 153, 189, 202–4, 206–7
hunting 6, 21, 115, 138, 142–3, 158–9
hypercorrect terms 53
hypodigm 72

identification 65–7, 71, 74, 123, 128, 131, 134, 136, 144, 220, 278
  and classification 65, 114, 130, 134
  flexibility in 133–4
ideolect 45
ideology 75, 94, 125, 127, 136, 142, 226
imitation calls 23
implicational relationship 85
inconsistency 150
indices 228
Indonesian language 24, 39–40, 190, 204, 209–11
induction 125, 218, 222
insects 17, 20, 22, 30, 42, 45, 47, 49, 52–3, 55–7, 60, 70, 74, 102–3, 105, 107–8, 114, 116–17, 164, 169, 172, 176, 178, 180–1, 197, 199, 210, 260–7
interlocking hierarchies 147, 220
intermediate categories 87, 119–21, 210
intersubjectivity 125, 134, 231
interviews 24
intrinsic meaning 51
introduction of new species 189, 202–4, 206
invertebrates 20, 42, 53, 155, 166, 227

joking 39, 185
juxtaposed uninomials 50, 56–8, 108

Kalam 16, 56, 68, 88, 115, 134, 186

keys 75, 109, 228
killing rituals 115, 179
knowledge 230–1, 233
  abstract 127
  core 43, 133
  distinction between stored and spontaneously produced 124
  encyclopaedic or empirical 127, 183
  maximum theoretical 43
  uneven distributions of 2
language change 187–214
level 67, 88–91, 93, 96, 123, 163, 216–18
lexemic economy 188
lexical
  classification 42, 45, 47, 59, 51–2, 59
  contraction 191
  differentiation, degree of 158, 162–3
  diffusion 48
  substitution 205
  taboos 175
lexicostatistics 35–6
life-forms 24, 87–8, 90, 95, 98–108, 110, 116–20, 122–3, 190, 193, 195, 198–9, 201, 210–13, 218, 278
linguistic
  classifiers 278
  competence 64, 137
  context 138
  drift 191
  model 64
Linnaeus 53, 68, 71, 90, 154, 216, 223, 277
lion 24, 189, 206
literacy 25, 31–4, 40, 62, 71, 75, 90, 127, 190–1, 204, 210, 213, 223, 228, 278, 281
living things, Nuaulu definitions of 95
lizards 15, 37, 42, 53, 61, 102, 105, 107–8, 116–19, 133, 139, 147, 154, 156–7, 165, 167, 172–4, 249–50
loan words 39, 195, 201
locational qualifiers 46
loose labels 64, 82, 87, 135, 155, 194

Malay 24, 97, 113, 190, 206
mammals 19–20, 42, 151, 155, 159, 210–11
Manusela 15, 36–7, 39, 200
marking 63, 83–6, 182, 189, 191, 193–5
marsupials 15, 153–5
meat, category of 115, 118, 161
memorate events 232
memory 222, 227
mental
  ability 138
  maps 148, 233
metamorphosis 61, 69, 166–7
metaphor 57, 150, 159, 165, 168–9, 171, 183, 185–6, 194, 216, 219, 233, 280
  genealogical 62
methodological indeterminacy 135, 144–7
mice 77, 82, 85, 87, 113
migration 135, 193, 208–9
mind and culture 215
mind, as an active rather than passive system 234
mnemonics 40
mockery of animals 171, 175–6, 182,
models for and models of 220, 230
molluscs 42, 56, 70, 98, 105, 143, 180, 268–70
Moluccas 3, 4, 8, 14, 35
  language-groupings of 3, 35–7, 191, 197, 199–201, 203, 205, 213, 281
monitor lizards 26, 61, 132, 139–40, 142, 147, 157, 164, 167, 169, 172, 174, 249–50
monkey 79, 152, 189, 193, 202–4, 207
monothetic criteria 108, 117
monotypic categories 124
morphological classification 110
morphosyntactic structure 35, 49–50
moths 41, 44, 51, 57, 102, 105, 107–8, 116–17, 121
multilingualism 37–40, 137, 189
mundane and symbolic classifications compared 3, 149, 215
mutual inclusion 59
myth 84, 94–5, 97, 113–14, 139, 152, 157, 165, 170, 175, 178, 182, 188

naming animals 40–1
natural kinds 55, 61, 67–71, 76, 102, 125, 168, 176, 216
nature, conceptions of 93, 95, 176
Ndumba 135–6, 141
negative allocation 82–3
network 146–7, 222
nicknames 43
nomenclature 27, 220
  scientific 16
non-basic categories 93–125, 279
non-directive techniques 111, 116–17, 225
non-morphological features and classification 109–15, 117, 123, 224–5
non-verbal learning strategies 64
noun marker 45
Nuaulu language 35–7
Nunusaku 36, 168, 191, 198

omniscient speaker-hearer 43, 66, 126
onomatopes 51, 203
ontogeny 168–9, 171
opportunistic reciprocal labelling 82
optionality, in binomial labelling 44, 52–3, 76, 191
oral traditions 89, 97
origination 59–61

over-generalised
  meanings 193
  schema 33

pairing 63, 83, 228
paradigms 92, 228–9, 234
parallelism 180
partonymy 60
pattern-matching 78
perceptual images 65
philology 226
phonetics 40
phonology 59, 192
photography 20, 23
phylogenetic categories 16, 277
picture cards 24
pigs 19, 41, 50, 56, 58–9, 86, 108, 113–15, 132, 158, 160, 172, 174–5, 186, 188–9, 197, 200–1
plurals 58, 63
polar types 86
polynomials 51–7, 62, 88, 139, 191
polysemy 76, 79, 81, 83, 96, 115, 118, 170, 178, 195, 203, 220
polythetic classification 98, 128–9, 139, 183
polytypy 45, 98–9, 102, 116, 162, 178
population
  density 14
  movement 189
Portuguese 190, 192, 206–7
post-colonialism 209–10
practical mastery 74
pre-classification 75
prefixes 45, 119, 121, 200
prehension 229–31, 233, 281
prejudice of prior conception 29–30
primary
  categories 88, 91, 95, 103, 116, 118
  terms 98, 116
principle of lexemic economy 188
private terms 43, 45–7
prohibitions 81, 137, 150, 159, 161, 171–6, 179–80, 182, 191
pronunciation 42, 44
proper names 56
provenience 59–61
proverbs 279
pseudo-compliance 131, 134
psychological reductionism 230
puns 203
pythons 60, 81, 157, 164–8, 172, 197–8, 205

question-and-answer-frame techniques 23, 25–7, 111, 224

rank 87–92, 98–9, 116, 216–18
rationality 163
rate 14–15, 20, 50, 77, 82, 85–6, 114, 117, 188–93, 202–4, 206, 280
reduplicates 51
reflexiveness 63–4, 123
relationship between primary and terminal categories 91–2
relationship terms 54, 56, 58, 171
relativism 16, 163
renegotiation of meaning 41
representational models and plans for action 281
representations in art 279
reptiles 15, 19, 127, 131, 134, 139, 142, 144, 147, 151, 155, 157, 159, 227
resettlement 135, 204, 208–9
residual categories 82–3, 85, 210, 220
restricted faunas 158
restriction of meaning 193–4, 213
ritual 39, 84, 94–5, 115, 139, 161, 179, 182, 184, 205
Rofaifo Enga 58, 68, 167, 186, 279
Rohua 7, 8, 11–12, 17, 23, 27, 40, 277

salience 67, 103, 174–5, 180, 184, 213
sanctification 125
schooling 39, 137, 190, 193, 209
segregates 217
semantic
  contact 55, 93, 191, 193
  contrast 120
  domains 110
  equivalences 192
  relationships 58–63
semantics 35, 42, 49–63
Sepa 6, 8, 37–40, 46, 137, 190, 192, 200–1, 208–9
Seram 3, 5–6, 8–9, 11, 14–16, 24, 36–7, 39
serial signification 233
set
  inclusion 222
  theory 218
sexual
  dimorphism 121, 154, 157
  qualifiers 48
  types 43, 48–9, 69
sharing 41–2, 125–48, 279
  defined 130
shellfish 13, 19, 49, 53, 56–7, 102, 117, 119, 122, 136, 143–4, 158
simultaneity 185
skinks 51, 56–7, 61, 70, 74, 87, 102, 105, 113, 134, 139–40, 143, 155, 165, 169, 171, 194
snakes 15, 26, 42, 45, 60–1, 65, 94, 102, 107, 113, 116–17, 119, 132, 137, 139–40, 153–7, 165, 168, 170, 172–3, 180, 210–12, 251–2

social
  classification 3
  construction of reality 162
  in relation to linguistic phenomena 234
  organisation 3
  value 163
socio-linguistic postivism 1
sound recordings 20, 23–4, 30
spatial 62
  imagery 61–2
  models 222
special purpose classifications 110, 113, 115, 117–18, 122–4, 143, 154, 159–60, 162, 194
species 61, 67
  concept 15
  diversity 14–15, 151, 153
  extinction 193
  folk concepts of 68, 71
  transformation, *see* transformation of species
specifics 87, 91, 210, 218
sphere of influence models 219
spiders 45, 59, 60, 83, 102, 105, 113, 116, 228–9, 273–4
spirits 115, 176, 185
spontaneous generation 166
status 136–7, 147
structuralism 182, 225
sufficient precision 233
suffixes 49, 59, 63
syllogisms 88, 182
symbolic
  and cognitive anthropology 277
  contrast 59, 173
  dualism 150
  and mundane 184–6
symbolism 111–12, 115, 124–5, 154, 159–60, 162, 184–5, 216
synonyms 17, 43, 47–8, 52, 54–5, 57, 60, 127, 144, 155–6, 191, 193, 217, 220, 279
system, concept of 221

taboos, *see* prohibitions
tabular representations 31
taxonomic
  artifacts 217, 223–6
  method 93, 146
  rigidity 226
  science 155–6
taxonomising as a thought process 217, 222
taxonomy 2, 16, 26, 28, 62–3, 69, 79, 71, 86, 89–90, 92, 95, 123–4, 146–7, 162, 178, 185–6, 186, 216–17, 219, 220–5, 229
  as theoretical icon 226
  as theory 217
  definition of 217–18
  scientific 16, 73, 122, 124, 128–9, 132–4, 209
technical
  and ritual classification 149, 165
  skills, as a factor affecting classificatory knowledge 138
terminal categories 17, 52–3, 55, 69–70, 88, 90–1, 102
tiger 24, 152, 206
Tobelo 97, 175, 227, 278
topological space 91–2
total
  concordance 111
  inventory 43
totemism 59, 81, 97, 113, 150, 154, 159, 166, 170–6, 184, 205
trade 6, 204–6
transformation of species 56, 62, 163–71, 185, 279, *see also* metamorphosis
transitivity 79, 88–9, 95, 121–2, 146, 218, 280
traps and trapping 20, 143, 159
tree-diagrams (dendrograms) 86, 132, 218, 225–6
triad tests 27, 29
trinomials 49, 51–3
turtles 42, 53, 59, 61, 81, 105, 107–8, 116–18, 120, 140, 142, 153, 157, 165, 167, 170, 172–3, 191, 207, 248
two-dimensional representation 219
type
  categories 75–83
  –token representations 219
typologies 228
Tzeltal 16–17, 33, 50, 120, 158, 162, 228

unaffiliated generics 89
unincorporated borrowed terms 43, 45–7
uninomials 45, 49, 51–3, 76, 88, 115, 139, 163, 169, 189, 191
unique beginners 87, 91, 96–8, 190, 195, 210, 218
universalist–evolutionist position 149
utilitarian classifications, *see* special purpose classifications

variation 3, 31, 43, 124, 150, 152, 223
  between contexts 135
  between informants 121, 132–3, 135, 145, 148
  by classificatory features used 142–3
  by ecological zone and subsistence technique 141–2
  by linguistic and social context 138–9
  causes of 134–47
  in the properties of living things 135, 143–4

variation (*cont.*)
measurement of 126–9
varietals 87, 91, 210, 218
Venn diagrams 132–2, 146–7, 219

Wallacea 4, 8
Wallace's line 4, 8, 281
water buffalo 189, 202–4, 207
worms 26, 103, 105, 107, 117–18, 201, 203, 212
WUG 210–1

zoological
data 16–22
identifications 17

Index of Nuaulu animal names

ai ntone 275
ama-ama 50, 254
asu 25, 45, 59, 69, 89, 100, 164, 195, 199, 202, 236
asu manene 195
asuwan 19, 26, 100, 114–15, 164, 172, 175, 182, 184, 199–200, 202, 240
atinotoe 101, 267
atori (nione) 57, 100, 263–4
awane 173, 207, 255
awane tunne 255

binatan 97–8, 190, 195

enu 59, 61, 81, 100, 106, 165, 167, 169, 172–4
enu hunane 78, 248
enu ikae 89, 140, 142, 248
eta-eta 50, 257
eti ai 56
eti hatane 57
eti nione 57
eti seni 56
etine 47, 49, 101–2

gaja 48

hahu 19, 41, 45, 49, 51, 59, 86, 100, 114–15, 172, 175, 196, 199, 237, 280
hahu kamutue 237
hahu nihu 188
hahu numte 57
hahu utue 262
hahu-maianane 50, 58, 108, 210
hahu-maianane-marane 108
hana-hana 50, 100, 263
hari 199, 208, 254
heti 257
hiko-hiko 50, 242
hiru 246
hite 100, 263
hite anae 263
hohone 56, 61, 77–8, 81–2, 131, 139, 147, 249
hoi manikate 256
hoi nuae 256
hoi waene 46, 256
hutiene 243

ika ai hata kopue 259
ika baus 48, 201, 208, 259
ika hahu 56, 69, 192, 209, 259
ika hutua onate 257
ika iloru 257
ika ka 208, 257
(ika) keuro 208, 256
ika koa totue 57, 255
ika kori-kori 192, 257
ika kutulauno 257
ika lasiato 208, 258
ika mala 257
ika mate seran 254
ika moti atue 258
ika msinae 192, 257
ika nakatua 258
ika nane192, 257
ikae Pia 56, 208
ika rina 256
ika sa sahune 258
ika sinatane 57, 258
(ika) siori 80, 254
ika timanne 255
ika tunene 57, 192, 258
ika(e) tuyo hutan 173, 208, 258
ika uri hatae 57, 192, 257
ikae 56, 86, 100, 102, 112, 114, 116–17, 175–6, 192, 212
ikae hanu totue 57, 257–8
ikae uro 258
ikura 258

imanane 101, 199, 267
imanine (inae) 101, 265
imanine Bunara 56
imanona 77, 82, 86–7, 100, 114, 195, 202, 236, 280
imanona ai ukune 87, 195, 236, 280
imarua 272
imasasae 45, 53, 78, 85, 112, 118, 139–40, 142, 194
imasasae ai atu 161, see also **imasasae ai ukune**
imasasae ai ukune 53, 61, 85, 164, 249
imasasae numa 52–3, 76, 85, 139, 161, 194, 249
inae (kilalante) 45, 59, 101, 265
inahai 122, 266
inahai putie 89, 122
inapone (marae) 101, 267
inararai 86, 164, 170–1, 178, 253
ipai 96–7
isa 81, 139–40, 142, 147, 172, 174, 249
isa inae 48, 169
isa pipane 48, 169
isanone 101, 178, 196, 265
isanon metene 265
isanon msinae 265

kahuneke ai ukune 273–4
kahuneke hatu nohu inae 228, 273
kahuneke masikune 274
kahuneke metene 273
kahuneke nikate 274
kahuneke numa 229, 274
kahuneke onate 229, 273
kahuneke titie 274
kahuneke wala-wala 45, 50, 59, 273
kahuneke wala-wala sonu 273
kahunekete 83, 101–2, 228–9
kako 164, 170–1, 203, 253
kamanahu metene 180, 264
kamanahu putie 180, 264
kamanahune 101, 180, 264
kanopone 80, 101, 273
kapetite 100, 263
kapetite anae 262
kasa' un 61, 77–8, 81–2, 88–9, 139–40, 165, 167
kasituri 205, 249
katanopu ai ukune 272
katanopu huse 272
katanopu kakante 272
katanopu kukurisa 272
katanopu makapotae iane 57, 272
katanopu manapesi 272
katanopu nahine 272
katanopu nuae 272
katanopu putie 272
katanopu sipu-sipu 50, 165, 272
katanopu sirisa 272
katanopu tanane 272
katanopu tonate unte 272
katanopu uri 57, 272
katanopune 101–2, 272
katenane 246
kau ai otoe 181, 261
kau ai otoe marae 261
kau ai otoe metene 78, 261
kau hatane 57, 181, 261
kau hatu tinaie 181, 261
kau kapine 181, 261
kau kasipi totue 57, 261
kau (mam) kahe kamane 57, 181, 260
(kau) kama nahune 176
kau Matoke 56, 261
kau nesate 181, 261
kau nuhune 181, 261
kau putie 181, 261
kau suenie 57, 181, 261
kau suto 181, 261
kau tuaman(e) anoe 56, 181, 261, 263
kauke 31, 45, 49, 83, 100, 102, 107, 116, 181, 199, 261
kau nimunone 45, 57, 181, 260–1
kere 53, 130, 170, 203, 253
kihoke 52, 159, 172–3, 175, 189, 200, 243
kina nahane 57, 245
kinahorake (inae) 100, 261
kinapari 101, 261, 264
kinapopote 69, 101, 262, 264, 266
kinapopo(te) inae 264
kinapopote (marae) 264
kina puku paine 262–3
kinapukune 78, 101, 169, 264
kinapuku(ne) anae 169, 264
kinapuku hatane 57
kinawerie 101, 196, 265
kinawerie inae 267
kinawerie msinae 55
kinoi (metene) 30, 100, 264
kinoke 172–3, 201, 246
kinosane 242
kitoe 100, 262
komu 182, 208, 257
konane 80, 243
kori-kori(e) 50, 55, 59, 61, 83, 101–2, 107, 116, 122, 168, 229
kori-kori ikine 83, 266
kori-kori inahai 51, 266
kori-kori marae 265–6
kori-kori masikune 122
kori-kori metene 265–6
kori-kori nika pante 265–6
kori-kori nika pane putie 57

kori-kori nusi 41, 57
kori-kori onate 83
kori-kori (onate) 266
kori-kori putie 83
kori-kori sinatane 57
kori-kori tuamane anoe 51
kori-kori uri (totue) 57, 266
korobou 100,202, 207, 237
kowe marae 242
kowe metene 242
kuha 100, 236
kukue 51, 244
kumake 47, 165, 272
kuma hihikuro 272
kuma kinihane 272
kuma moti 272
kumte 51, 265
kumte inae 49, 267
kuna-kuna 50, 245
kunini 205, 244
kunte 101, 169, 196, 267
kunte inae 169, 263, 266
kura-kura 50, 246
kusa-kusa 50, 235
kusumun 101

lau 100, 236
lema 69, 161, 208, 256, 258

maianane 86, 100, 115, 164, 189, 202, 237
mainase 61, 65, 78, 251
mainase metene 84
mainase putie 69, 84
maisan 24, 48, 189, 206
makapana 96–7
makarota pina msahane 100, 262
makasisi popole 49, 100, 263
makasisi popole marae 260
makasisi popole masikune 260
makasisi popole metene 260
makasisi popole msinae 260
makasisi popole pokotuene 260
makueni 60; see also **tui-tui**
mansia 97, 168
man totane 245
man tuamane 52, 245
man tulalakane 121, 169, 195, 242
man inae 169, 195; see also **man winai**
man winai 121, 169, 242
manu asan 193
manu kasa neane 246
manu pake 243
manue 45, 49, 51, 72, 81, 86, 88–9, 92, 100, 102–3, 107, 112, 114, 116–18, 121, 132, 172, 195, 199, 202, 212
marane 45, 49, 52, 64, 70, 88, 100, 118, 121, 159, 174, 184, 196, 280
mara hanaie 46
mara hehue 156
mara kikune 48
mara kokowe 47, 49, 121, 156, 180, 191, 235
mara koko msinae 156
mara koko putie 45, 156
mara makinete 45, 48, 88, 121, 164, 172–4, 180, 191, 235
mara makioi 156
mara nohue 48
mara siha 121, 156, 180, 191, 235
mara osu 45, 121, 180, 191, 235
mara putie 172
mara(ne) tina totue 44, 52, 55, 64, 265
mata luyun 199–200, 259
matamaine 100, 261
matamai putie 261
matamai re'unosu 261
mate 161, 208, 254
mate inae 208, 254
mau 59, 100, 114, 175, 202, 237
mimi 101, 276
mirine 100, 236
mita hahu 56, 194, 271
mita hanapakue 271
mita nuae 83, 271
mita oane 271
mita pina 271
mita putie 271
mita sanane 86, 271
mita Sepa 56, 271
mita waene 31, 83, 271
mitane 47, 101–2, 271
mko; see **kowe**
mnaha (numa) 77, 82, 85–7, 100, 102–3, 118, 193, 202, 236, 280
mnaha ai ukune 85
mnaha niane; see **mnaha**
mnaha wesie 280
mnatone 275
moinapu 44, 241
moi numte 57
momar 46, 209, 257
monosia 209, 259
monote inae 101, 267
mui numte 80, 245
mui suane 52, 101
muinu 191
muinu puane 241
muinu toa 241
mum anae 267
muma 196, 242
mumne 101, 164, 267
muna usite 101, 265
muria 206

nai (sisie) 77, 80, 100, 263

naitanane 100, 202, 237
naka 178
nakatua (putie) 19, 25, 46, 60, 62, 88, 118, 172–3, 189, 191, 196, 205, 243
nakatua saha 19, 270
nakatua wekae; see **wekae**
nam hosu 255
nam wanae 255
namue 208, 255
nanate 56, 252
nau asue 273
neune 80
neune anae 245
nike metene 276
nike msinae 276
nike putie 276
nikenuke 45, 101, 276
nikonake 164, 275
nini anane 275
nini Bunara 56, 84, 275
nini ikine 84
nini oni 275
niniane 45, 101, 165, 170, 199, 211, 275
nione inae 101, 267
nopa hanae 157, 169; see also **nopa hanaie**
nopa hanaie 84, 139, 250
nope ina(e) 84, 89, 139, 157, 165, 167, 169, 170–1, 250
nota hatu nohue 56, 66–7, 238–9
nota kiniku putie 66–7, 238–9
nota maka paluwe 67, 77, 82, 238–9
nota mana waute 239
nota muni munte 66–7, 82, 238–9
nota sapane 53, 57, 66, 77, 88, 238
nota suite 66
nota tina totue 67
notane 51, 53, 72, 88, 100, 102–3, 172, 174, 196, 221, 239
notu 31, 45, 53, 61, 78, 81, 84, 86–9, 100, 102, 106–7, 116–17, 130, 139–40, 142, 155, 164, 167–70, 182, 195, 203, 253, 278
notu anae 164, 169–70, 253
nuae huae 69, 83, 101, 275
nunu 101–2, 122
nunu ai otoi 268
nunu asu meie 269
nunu hihikuro 268
nunu hua inate 269
nunu hun 269
nunu inae 270
nunu inanaie 268
nunu iwa 268
nunu kakante 19, 270
nunu keon 269
nunu ketenane 269
nunu kinihane 269
nunu mara nanate 270
nunu marane 56, 269
nunu mata ipole 48–9, 88
nunu mata (ipole) hanaie 48, 85, 180, 268
nunu mata ipole pina 85, 88, 181, 268
nunu mata putie 88, 268
nunu moi ika 270
nunu nuae 122, 161
nunu oiro 269
nunu purai 271
nunu saun kanie 269
nunu sesu nuae 89, 181, 269
nunu sesu waene 161, 181, 269–70
nunu sikewe aie 270
nunu tapako 57, 268–9
nunu tari 269
nunu Tihun 56
nunu unie 192, 268–9
nunu waene 122, 161
nunu wae inate 269
nunu wenate 269
nunu weri-weri 269
nusi 119
nusi kiene 243
nusi onate 80, 243
nusi puane 243
nusi seane 243
nusi takanasi 164, 182, 241
nusi tanane 48, 69, 80, 240

okote 47
opor 246

peku 81, 100, 106, 140, 142, 165, 167–9, 172–5, 191, 248
peni 92, 102–3, 108, 112, 114–18, 132, 158, 161, 210, 279
peni asuwan 115
peni hahu 115
peni maianane 115
peni wanue 121–2
pepeko 202, 241
pepeuro 271
peskada 192, 207, 209, 256
peti kunie 57, 255
petie 208, 255
petie wae nosite 255
pia 257
poro-poro 50–1, 78, 84, 86–9, 106, 118, 139–40, 142, 153, 164, 166–8, 170–1, 194, 203, 253
poso 51, 56, 78–9, 82–3, 88, 100, 102, 107, 112, 116, 118, 133–4, 140, 142, 155, 165, 167, 194
poso (noha) ai totu kopue 56, 87, 89, 155, 250
poso kaimarane 51, 56, 250
poso kaimarane ikine 84, 89
poso kaimarane onate 51, 84

poso noha kunie 57, 87, 155–6, 250
poso noha metene 87, 155–6, 250
puane 80, 172–3, 199, 243
puha 45, 140, 143, 147, 164, 172, 174, 196, 199, 249
punu 46, 56, 208, 257
puo 45, 61, 78, 81, 139–40, 142–3, 147, 164, 172, 174, 196, 250
puo inae 48, 169
puo pipane 48, 169

riko-riko 50, 273
riku ai ukune 55, 264
riku(ne) anae 169, 262
riku hanaie 262
riku nasate 57
riku pate 262–3
riku wesie 55, 262
rikune 100, 102, 169, 178, 262, 264
rikune ari ai (kanapua) 57, 264
rompa 207
ruka 80, 193, 202

sakoa 80, 178, 244
samane 45, 80, 241
saneane 80, 245
sanna 275
sapi 100, 114, 192, 202, 207, 237
sa sahune 57, 101, 263
sene nan 265
sene nanan 267
sene taumane 100, 265
senete 101
sinne inae 176, 264
sioi 245
sisa une 193
siseite 80, 244
sisie 77, 100, 263
sisie kauke 56, 263
sisie numan 263
sisie putie 263
sohane 164, 275
sohane inae 267
sohone 101
soihihi 69, 245
sonto 101, 279
sonto hatu 270
sonu 44, 199, 255
sopate 246
sopite 19, 24, 41, 114, 164, 182, 196, 198, 200, 245
sote 78, 80, 240
sote nakone 242
suanane 80, 244
suite 246
sunu 208, 258
sunu moti 257
susine 100, 263–4
susi onate 172
susue 69, 164, 275
suto 272

tananae (inae) 100, 261, 263
taniri 208, 256
taripan 69, 83, 101–2, 276
tekene 45, 61, 65, 79, 100, 102, 107, 114, 116–17, 132, 140, 155, 165, 167–8, 170–1, 173, 212
teke konomete 84, 251
teke msinae 251
teke nuae 252
teke panarine 69, 172–3, 251
teke patona 45, 159, 164–5, 168, 172, 180, 196, 205, 251
teke soata 157, 251
teke tam niane 84, 157, 251
teke tuamana 157, 251
teke waene 252
teteye 26, 51, 88, 170, 253, 278
tialapeti 245
tika poho-poho 50, 246
tine metene 276
tine msinae 276
tinene 101, 276
tinnanae 80, 246
tuaman (i)nae 203, 275
tuie 244
tui-tui 50, 60, 100, 202, 236
tuku-tuku 50, 80, 178, 244
tumane-maine 192, 257

uane utue 100, 265
unate 98, 229
une nuae 101, 276
une marae 70, 276
une masikune 70, 276
une metene 70, 276
une msinae 70, 276
une putie 70, 276
une-une (caterpillar) 47, 49–50, 61, 101–2, 168, 203
une nusi 57
une sinatane 57
une-une (goat) 50, 100, 202, 237
urita 101, 270
uri usue 101, 260, 267
utu 47, 100, 196, 262, 267, 273
utu asu 47
utu hahu 47
utu maianane 47
utu wesie 272

wanapoi 258
wanu 208, 255–6
wekae 25, 60, 80, 88, 191, 205, 278

wekae marae 244
wekae msinae 243
woku 199–200, 208, 254
woku ikae 254
woku karakaiya 171, 254
woku sanihuhue 254
woku sonu 257
wotu-wotu 50, 208, 255

yapato 61, 201, 207, 208, 255
yapato putie 84
yapato masikune 84

Index of scientific names for animal species mentioned in the text

Acanthophis antarcticus 78, 131–32, 252
Acanthurus lineatus 258
Accipiter cirrhocephalus 241
Accipiter novoehollandiae 241
Achatina fulica 269
Acridotheres tristis 80
Actitis hypoleucos 241
Agrynus resectus 263
Alcedo atthis 245
Alectis sp. 257
Alepes mate 257
Alimena sp. 266
Alisterus amboinensis 80, 244
Allograpta sp. 267
Altica sp. 264
Altobunus formosus 273
Amaurornis olivaceus 242
Amphidromus (?) sp. 269
Anabas testudineus 57, 258
Anas boscas 241
Angaria lacinatus 85, 181, 268
Anguilla bicolor 173, 255
Anguilla celebensis 255
Anguilla marmorata 255
Anobium sp. 56, 263
Anopheles farauti 267
Anopheles (Myzomiz) punctulatus 267
Apis cerana 265
Apis dorsata 265
Apis florea 265
Apis indica 45, 265
Aplonis metallica 246
Aplonis mysolensis 246
Aponomma gervaisi 273
Aporia crataegi 266
Apus affinis 80
Argiope aemula 274
Argiope sp. 274
Arhopala ate 266
Aspidomorpha areata 262
Aspidomorphus muelleri 78, 252
Atractorcerus sp. 263
Auxis thazard 257

Babyroussa sp. 188
Baeturia sp. 77, 263
Balistes spp. 258
Barbatia fusca 269
Basilornis corythaix 21, 246
Birdantis sp. 263
Birgus latro 50, 165, 272
Boiga irregularis 69, 131, 172–3, 251
Bos spp. 237
Bregmaceros macclellandi 256
Bubu zeylonensis 80
Bubulcus ibis 240
Buceros rhinoceros 24
Butorides striatus 241

Cacatua galerita 243
Cacatua moluccensis 19, 21, 46, 172–3, 189, 200, 205, 243
Caesio pisang 192
Caesio spp. 57, 257
Calandra granaria 264
Calandra oryzae 169, 264
Calliphora billardierii 78, 262
Callosciurus sp. 207
Callydon sp. 258
Caloenas nicobarica 21
Calotes cristatellus 61, 77–8, 89, 105, 131, 139–40, 165, 249
Candoia carinata 65, 69, 78, 131, 251
Canis familiaris 25, 69, 89, 164, 195, 236
Cantao ?rudis 262
Capra aegagrus 50, 237
Caprimulgus macrurus 50, 245
Captotermes sp. 262
Caranx spp. 257
Cardiodactylus novaeguineae 261

Cardiosoma sp. 272
Caretta caretta 78, 248
Caridina nilotica 271
Carlia fusca 56, 89, 131, 155, 250
Carlia sp. 131, 250
Casuarius casuarius 19, 26, 164, 172, 240
Centropus bengalensis 80, 244
Cerberus rhynchops 252
Cervus timorensis 19, 164, 237
Ceyx lepidus 52, 245
Ceyx sp. 245
Chalcites spp. 244
Charadrius leschenaultii 242
Charadrius sp. 50
Charadrius mongolus 242
Charmosyna placentis 244
Charmosyna spp. 206
Cheilinus diagramma 46, 208
Cheilinus spp. 257
Chelonia mydas 78, 248
Chloritis mima 269
Chloritis ungulina 269
Chrysodema malacca 263
Chrysodema sp. 263
Chrysopelea rhodopleuron 251
Cimex sp. 262
Cistopus indicus 270
Clithon angulosa 269
Clithon(?) subsulcata 269
Clupea longiceps 208, 254
Clupea schrammi 208
Clupea stereolepsis 208, 254
Clypeomorus subbrevicula 269
Coccinella repanda 263
Collocalia esculenta 80, 201, 245
Collocalia spodiopygia 245
Conus g. *lividus* 268
Conus cf. *monachus* 268
Conus cf. *pertusus* 268
Conus spp. 144
Copsychus saularis 80
Coptocerus biguttatus 264
Corvus enca 246
Coturnix chinensis 69, 242
Criniger affinis 193
Crocodylus porosus 164, 172, 249
Cuculus saturatus 51, 244
Cuculus variolosus 244
Culex incl. *ceramensis* 267
Cuora amboinensis 100, 131, 165, 172–4, 191, 248
Cypraea arabica 269
Cypraea carneola 269
Cypraea lynx 269
Cypraea spp. 85, 144
Cypselurus nigripennis 208
Cypselurus spp. 256

Danaideu sp. 266
Danaus juventa 266
Dandubia sp. 77, 80, 263
Dasia smaragdina 131, 250
Dasyatis kuhli 208, 254
Decapterus macrosoma 46, 257
Dendorix ceramensis 266
Dendrelaphis pictus 84, 131, 157, 251
Dermochelys coriacea 78, 89, 248
Diadema saxatile 276
Diadema setosum 276
Dicrurus bracteatus 50, 246
Diodon sp. 258
Dobsonia moluccensis 66–7, 77, 238
Dobsonia viridis 66, 238
Dolichoderus thoracicus 265
Drace lineatus 61, 78, 131, 139, 249
Drosophila ananassae 267
Drosophila spp. 164
Drupa morum 268
Drupa spathulifera 269
Drupa spp. 57, 144, 192
Ducula bicolor 243
Dugong dugon 259
Duomitus ceramicus 265
Dupetor flavicollis 240
Dysdercus singulatus 262

Echinotrix diadema 276
Egretta garzetta 241
Egretta intermedia 241
Egretta sacra 241
Eclectus (Larius) roratus 25, 80, 191, 205, 243
Emballonura nigrescens 239
Emballonura raffrayana 239
Emoia cyanura 51, 89, 131, 250
Emoia kuekenthali 131, 250
Eos bornea 205, 244
Eos semilarvata 243
Eos squamata 244
Eos spp. 206
Equus caballus 237
Eretmochelys imbricata 248
Erionata thrax 266
Eudynamys scolopacea 244
Eugongylus rufescens 131, 139, 169, 250
Eulipoa wallacei, see *Megapodius wallacei*
Eumenes sp. 265
Eunice viridis 203, 275
Euphanta monoleuca 262
Euphanta spp. 178
Euploea sp. 266
Eutermes amboinensis 262
Euthynnus sp. 257

Falco moluccensis 241
Falco peregrinus 241

Felis catus 24, 236
Fistularia petimba 46, 256
Fordonia leucobalia 252
Fregata ariel 240
Fregata minor 240

Gallinula tenebrosa 242
Gallus gallus 89, 121, 169, 172, 195, 242
Gekko vittatus 53, 85, 131, 164, 207, 249
Geoffroyus geoffroyi 244
Glenea corona 178, 180, 264
Glenea sp. 264
Glyciphanax sp. 264
Glycyphana perridis 78, 263
Gnoma giraffa 176, 180, 264
Gnoma zonaria 264
Graphium codrus 266
Gryllaocris sp. 181, 261
Gymnophaps mada 243

Haemotopinus suis 262
Halcyon chloris 245
Halcyon lazuli 245
Halcyon sancta 245
Hemidactylus frenatus 21, 52, 76, 78, 85, 131, 139, 194, 249
Hemiprocne mystacea 245
Hemiramphus marginatus 208, 255
Heniochus acuminatus 257
Herpestes javanicus 207
Hexacentrus sp. 261
Hexamitodera semivelutina 264
Hierodula sp. 78, 260–1
Hippocampus polytaenia 256
Hippocampus spp. 207
Hipposideros ater 67, 239
Hirundo rustica 80
Hydrosaurus amboinensis 48, 78, 81, 105, 139–40, 142, 147, 157, 169, 172, 249
Hypolimnas pandanus 266

Inachis sp. 266
Isometrus maculatus 273
Istiophorus orientalis 192, 257
Ixobrychus sinensis 241

Kallima pylarchus 266
Katsuwonus pelamis 257
Kishinoella tonggol 208, 257

Labienus moluccanus 264
Lactarius lactarius 258
Lambis lambis 85
Lanelalus insularis 100, 263
Laphria sp. 267
Larius roratus; see *Eclectus roratus*
Laticauda colubrina 252
Laticuda laticauda 252
Latirus turritus 89, 181, 269
Latrodectus hasselti 274
Leptocoma jugularis 80
Leptoptilus dubius 80
Lichmera monticola 246
Limulus moluccensis 276
Linckea laevigata 70, 276
Litoria amboinensis 78, 131, 164, 178, 253
Litoria infrafrenata 21, 50, 78, 89, 131, 164, 253
Litoria sp. (bicolor group) 78, 131, 164, 169, 253
Loligo edulis 270
Lonchura straiata 80
Lorius domicella 21, 52, 159, 172–3, 189, 200, 243
Lucanus sp. 263
Lunella (Turbo) coronatus 48–9, 85, 144, 180, 268
Lutjanus fulviflamma 208, 257
Lutjanus rufolineatus 192, 257
Lutjanus sanguineus 257
Lycaena sp. 266
Lyssa docile 57, 266

Mabuya multifasciata 57, 131, 155–6, 250
Mabuya 'rudis' 131, 250
Macrobrachium australe 271
Macrobrachium sp. 271
Macroglossus minimus 66, 77, 238
Macropygia amboinensis 80, 172–3, 243
Maenas maculifascia 266
Megapodius reinwardt 242
Megapodius (Eulipoa) wallacei 21, 200, 242
Melania hastula 269
Melania spp. 181
Melanoides(?) granifera 269
Melanoides(?) punctata 269
Melanoides spp. 181
Melomys fulgens 195
Melomys spp. 236
Merops ornatus 193
Metapenaeus sp. 271
Metasesarma aubryi 272
Microcerotermes amboinensis 262
Micropsitta bruijnii 243
Mictis amboinensis 262
Mictis profana 55–6, 262
Mictis spp. 178
Milvus migrans 80
Mindrua sp. 262
Moncanthus tormentosus 208
Monomorium spp. 265
Morelia amethistina 251
Mugil troscheli 256
Mulciper linnaei 176, 264
Muraena spp. 255
Murex spp. 192

Murex tribulus 269
Mus musculus 21, 28, 85–7, 193, 236
Musca domestica 267
Myrmeleon sp. 263

Nania aulica 269
Nanina citrina 269
Nautilus pompilius 19, 270
Nectarinia asparia 246
Nectarinia jugularis 246
Nectarinia sericea 80
Nephilia maculata 274
Nephilia sp. 45, 273
Nerita antiquata 269
Neritodryas cornea 269
Nerius(?) nigrofuscus 169, 267
Nerius sp. 267
Ninox squamipila 80, 178, 244
Nositicta sp. 260
Notophoyx picata 78
Nyctalemon agathyrsus 266
Nycticorax caledonicus 241
Nyctimene sp. 239

Octopus aegina 270
Ocypode cordimana 272
Odontomachus simillimus 265
Oncocomeris spp. 178, 262
Ophiocephalus micropelties 255
Ophiocephalus striatus 255
Ophiocephalus spp. 80, 208
Oriolus forsteni 21
Oriolus oriolus 80
Orthellia timorensis 267
Orthetrum villosovittatum 260
Orthotomus spp. 80
Oryctes rhinoceros 176, 264
Ostrea spp. 270
Otus bakkamoena 80
Otus magicus (scops) 50, 80, 178, 244

Pachliopta polydorus 266
Pachycephala pectoralis 245
Padda oryzivora 80
Palamnaeus spp. 80
Paludina sp. 270
Pandion haliaetus 164, 241
Panulirus versicolor 271
Papagobiodon echinocephala 258
Papilio alcidinus 265
Papilio fuscus 265
Papilio lorguinionas 265
Papilio ulysses 265
Papuana huebrieri 262
Paradoxurus hermaphroditus 105, 136, 236
Paraplotosus albilabris 50, 208, 255
Parascorpaena maculipinnis 258
Parotis sp. 265
Parthenos var *brunea* 266
Pediculus humanus 262
Pempheris sp. 257
Penaeus monodon 271
Pentaceraster spp. 70, 276
Periglypta reticulata 270
Periophthalmus vulgaris 258
Periplaneta americana 261
Periplaneta australasiae 261
Periplaneta sp. 261
Phalacrocorax melanoleucos 240
Phalacrocorax sulciostris 240
Phalanger maculatus 48, 121, 154, 164, 172–4, 191, 234
Phalanger orientalis 49, 121, 154, 172, 191, 234
Phalanger spp. 197
Phalaropus lobatus 241
Pheretima (Pheretima) ceramensis 275
Philemon subcorniculatus 172–3, 201, 246
Phrynomantis fusca 131, 164, 253
Phyllophora bidentata 261
Physomenus grossipes 262
Pinctada maxima 270
Pisania sp. cf. *crenilabrum* 144, 269
Pitta brachyura 80
Platycrana viridana 78, 261
Platymantis papuensis 51, 130–1, 253
Platypleura sp. 50, 263
Plisthenes merianae 262
Plotosus anguillaris 255
Podops sp. 264
Poliolimnas cinereus 242
Pomponia imperatoria 80
Pongo pygmaeus 80
Pontoscolex corethrurus 275
Porphyrio porphyrio 242
Portunus pelagicus 272
Portunus sanguinolentus 272
Porzana pusilla 242
Pranesus duodecimalis 256
Priamus sp. 266
Pristiopsis sp. 171, 254
Protoreaster nodosus 70, 276
Psittacula krameri 80
Pteropus melanopogon 19, 57, 66, 77, 238
Pulex irritans 267
Pycnonotus goiaver 80
Pycononotus jocosus 80
Python reticulatus 131, 159, 164–5, 172, 251

Rallina fasciata 242
Rallus philippensis 242
Ramphotyphlops multilineatus 251
Rana modesta 89, 131, 164, 253
Rana spp. 78, 131, 164, 263
Rastrelliger neglectus 208
Rastrelliger spp. 69, 256

Rattus exulans 87, 195, 236
Rattus rattus 87, 236
Rattus sp. 86–7
Reinwardtoena reinwardtii 243
Remis sp. 270
Remis (Corbicula) sp. 270
Rhinolophus keyensis 239
Rhynochomeles prattorum 15, 182
Rhynochophorus bilineatus 78, 169, 264
Rhynochophorus ferrugineus 264
Rhyticeros plicatus 19, 24, 41, 164, 200, 245
Rinocricus sp. 276
Riopa (Eugongylus) rufescens 78, 84, 100, 157
Ropalidia sp. 265

Tabanus sp. (*funipennis* group) 267
Tabanus sp. (nr. *furunculigenus*) 267
Taenia spp. 164, 275
Tanygnathus megalorhynchos 80, 243
Tanysiptera galatea 80, 245
Tectocoris diophthalmus 262
Tenodera australasiae 78, 260
Teteogryllus consimilis 56, 261
Thenus orientalis 271
Therapon 257
Theridion sp. 274
Thiara amarula 269
Threskiornis moluccus 44, 241
Thrissina baelama 50, 254
Thrombium sp. 272
Thynnus albacares 257
Thyropygus sp. 276
Tiliqua gigas 78, 84, 89, 100, 139, 165, 169, 250
Trichiurus haumela 192, 257
Trichiurus savalo 208
Tridachnes elongata 19, 270
Tridacna maxima 144, 270
Tripneusteus gratilla 276
Trochus costatus 268
Trochus flammulatus 268
Trochus niloticus 144, 268
Trochus tenebrica 144, 268
Troides oblongmaculatus 266
Tupaia sp. 207
Turbo argyrostomus 268
Turbo coronatus, see *Lunella coronatus*
Turbo porophyrites 268
Turbo setosus 268
Turbo spp. 144
Tylosurus sp. 255
Typhlops braminus 251
Typhlops kraali 251
Typhlops ligorostris 251

Uropygi sp. 273

Valanga nigricornis 261
Varanus indicus 48, 78, 131–2, 139, 157, 164, 169, 172, 250
Viverra tangalunga 105, 135, 189, 236
Vivipara javanica 270

Xenocerus semiluctuosus 264
Xenocerus sp. 264
Xestophyrs sp. 261

Zenarchopterus sp. 255

Cambridge Books Online © Cambridge University Press, 2009

Cambridge Studies in Social and Cultural Anthropology

Editors: ERNEST GELLNER, JACK GOODY, STEPHEN GUDEMAN, MICHAEL HERZFELD, JONATHAN PARRY

11 Rethinking Symbolism*
DAN SPERBER. Translated by Alice L. Morton
15 World Conqueror and World Renouncer: A Study of Buddhism and Polity in Thailand against a Historical Background*
S. J. TAMBIAH
16 Outline of a Theory of Practice*
PIERRE BOURDIEU. Translated by Richard Nice
17 Production and Reproduction: A Comparative Study of the Domestic Domain*
JACK GOODY
27 Day of Shining Red: An Essay on Understanding Ritual*
GILBERT LEWIS
28 Hunters, Pastoralists and Ranchers: Reindeer Economies and their Transformations*
TIM INGOLD
32 Muslim Society*
ERNEST GELLNER
36 Dravidian Kinship
THOMAS R. TRAUTMANN
39 The Fish-People: Linguistic Exogamy and Tukanoan Identity in Northwest Amazonia
JEAN E. JACKSON
41 Ecology and Exchange in the Andes
Edited by DAVID LEHMANN
42 Traders without Trade: Responses to Trade in Two Dyula Communities
ROBERT LAUNAY
45 Actions, Norms and Representations: Foundations of Anthropological Inquiry*
LADISLAV HOLY AND MILAN STUCKLIK
46 Structural Models in Anthropology*
PER HAGE AND FRANK HARARY
47 Servants of the Goddess: The Priests of a South Indian Temple
C. J. FULLER
49 The Buddhist Saints of the Forest and the Cult of Amulets: A Study in Charisma, Hagiography, Sectarianism, and Millennial Buddhism*
S. J. TAMBIAH
51 Individual and Society in Guiana: A Comparative Study of Amerindian Social Organizations*
PETER RIVIERE
53 Inequality among Brothers: Class and Kinship in South China
RUBIE S. WATSON
54 On Anthropological Knowledge
DAN SPERBER

55 Tales of the Yanomani: Daily Life in the Venezuelan Forest*
JACQUES LIZOT. Translated by Ernest Simon
56 The Making of Great Men: Male Domination and Power among the New Guinea Baruya*
MAURICE GODELIER. Translated by Ruper Swyer
57 Age Class Systems: Social Institutions and Politics Based on Age*
BERNARDO BERNARDI. Translated by David I. Kertzer
58 Strategies and Norms in a Changing Matrilineal Society: Descent, Succession and Inheritance among the Toka of Zambia
LADISLAV HOLY
59 Native Lords of Quito in the Age of the Incas: The Political Economy of North-Andean Chiefdoms
FRANK SALOMON
60 Culture and Class in Anthropology and History: A Newfoundland Illustration*
GERALD SIDER
61 From Blessing to Violence: History and Ideology in the Circumcision Ritual of the Merina of Madagascar*
MAURICE BLOCH
62 The Huli Response to Illness
STEPHEN FRANKEL
63 Social Inequality in a Northern Portugese Hamlet: Land, Late Marriage, and Bastardy, 1870–1978
BRIAN JUAN O'NEILL
64 Cosmologies in the Making: A Generative Approach to Cultural Variation in Inner New Guinea*
FREDRIK BARTH
65 Kinship and Class in the West Indies: A Genealogical Study of Jamaica and Guyana*
RAYMOND T. SMITH
66 The Making of the Basque Nation
MARIANNE HEIBERG
67 Out of Time: History and Evolution in Anthropological Discourse
NICHOLAS THOMAS
68 Tradition as Truth and Communication
PASCAL BOYER
69 The Abandoned Narcotic: Kava and Cultural Instability in Melanesia
RON BRUNTON
70 The Anthropology of Numbers*
THOMAS CRUMP
71 Stealing People's Names: History and Politics in a Sepik River Cosmology
SIMON J. HARRISON
72 The Bedouin of Cyrenaica: Studies in Personal and Corporate Power
EMRYS L. PETERS. Edited by Jack Goody and Emanuel Marx
73 Bartered Brides: Politics, Gender and Marriage in an Afghan Tribal Society
NANCY TAPPER
74 Property, Production and Family in Neckerhausen*
DAVID WARREN SABEAN
75 Fifteen Generations of Bretons: Kinship and Society in Lower Brittany, 1720–1980
MARTINE SEGALEN. Translated by J. A. Underwood
76 Honor and Grace in Anthropology
Edited by J. G. PERISTIANY AND JULIAN PITT-RIVERS
77 The Making of the Modern Greek Family: Marriage and Exchange in Nineteenth-Century Athens
PAUL SANT CASSIA AND CONSTANTINA BADA
78 Religion and Custom in a Muslim Society: The Berti of Sudan
LADISLAV HOLY
79 Quiet Days in Burgundy: A Study of Local Politics
MARC ABÉLÈS. Translated by Annella McDermott

80 Sacred Void: Spatial Images of Work and Ritual among the Giriama of Kenya
DAVID PARKIN
81 A Place of their Own: Family Farming in Eastern Finland
RAY ABRAHAMS
82 Power, Prayer and Production: The Jola of Casamance, Senegal
OLGA F. LINARES
83 Identity through History: Living Stories in a Solomon Island Society
GEOFFREY M. WHITE
84 Monk, Householder and Tantric Priest: Newar Buddhism and its Hierarchy of Ritual
DAVID GELLNER
85 Hunters and Herders of Southern Africa: A Comparative Ethnography of the Khoisan Peoples*
ALAN BARNARD
86 Belonging in the Two Berlins: Kin, State, Nation*
JOHN BORNEMAN
87 Power and Religiosity in a Post-Colonial Setting: Sinhala Catholics in Contemporary Sri Lanka
R. L. STIRRAT
88 Dialogues with the Dead: The Discussion of Mortality among the Sora of Eastern India
PIERS VITEBSKY
89 South Coast New Guinea Cultures: A Regional Comparison*
BRUCE M. KNAUFT
90 Pathology and Identity: The Work of Mother Earth in Trinidad
ROLAND LITTLEWOOD

*available in paperback

Cambridge Books Online © Cambridge University Press, 2009

Cambridge Books Online © Cambridge University Press, 2009

Cambridge Books Online © Cambridge University Press, 2009